

THE
SE A-MAN'S
KALENDER:

OR
An EPHEMERIDES of the Sun, Moon,
and certain of the most notable Fixed Stars.

AS ALSO,
A Table of the LONGITUDE and LATITUDE
of all the most eminent Places of the World:
First Calculated by JOHN TAP.

Since Corrected and Enlarged, with many Additions:
Viz.

New exact Tables of the NORTH-STAR,

New Tables of 65 of the principall Fixed STARS;
their time of coming upon the Meridian every day,
With their Right Ascension, and Declination, &c.

With the discovery of a way to finde the long hidden
Secret of LONGITUDE, By HENRY BOND, Teacher
of the Mathematicks in the Bulwark near the Tower.

All which are now newly calculated and corrected,
and many new Rules and Tables added
By Henry Philipps, Philo-Nauticus.

L O N D O N,

Printed by ROBERT and WILLIAM LEYBOURN, for
GEORGE HURLOCK, and are to be sold at his
Shop at Magnus Church-corner, 1659.




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C

TO THE COURTEOUS

Readers health.

 Gentle and indifferent Readers, you who are ready to applaud that which is good, and passe over with silence that which is not hurtful, without stopping the work, or deriding the Author: and who having some skill, are desirous of more knowledge in the *Art of Navigation*, and other Mathematical studies: to you I commit the censuring of my Work, and heartily wish you the profit of my labours: knowing that the wise will rather wink at small faulkes, then rashly reprove that which may profit others, not pleasure themselves: And though (as I say) the curious and expert Mariners finde nothing herein contained, which may satisfie their expectation, yet I hope they will judge favourably of my intentions, and with patience passe it over for affection to the Art is self, wishing charitably that my skill were answerable to my will. As for the meaner sort, whose Experience have not been fitted with Arts rudiment, nor their Judgments fined with demonstrative illustrations, in the Mathematical Sciences, but onely are now (as it were) scraving themselves with willing minds to learn what before they wanted, I make no question, but as by these following *Tables and Propositions* they may reap profit, so accordingly, in yielding friendly censures upon me and my work, they shall answer my expectation with full recompence of my passed labours: So intreating the Courteous Readers to do me that favour, as to correct what they shall find amisse, either in the Printers over sight, or mine own error: I shall not only endeavour the mending of them in the next Impression, but also be very thankful for them, when at any time they shall give me notice thereof, resting withal,

Your obliged Friend,

JOHN TAP.



To the ingenious SEAMAN.

THis Book needs no commendations, having for a long time past so currently through the hands of most men. Indeed it is a compendium (if well understood) of the whole Art of Navigation; But its chiefest excellency consists in the Astronomical part thereof; the Tables whereof are so plain and full, and well ordered, that there never were the like in any Book. And though these Tables are subject to grow old, and wear out of Date; yet such hath been the good fortune of the Book, and the care of the Stationer, that the quick sale of the Book hath encouraged him still to renew the Tables; For by this means, the Book hath not onely been preserved in its first excellency and exactnesse, but hath from time to time received the friendly additions of Mr. Henry Bond, an Ancient Professor of these Arts. And whereas the revisal thereof hath lately fallen into my hands, finding the Book to be of so great use, and so agreeable to my Genius, I have been the more careful to make such additions and corrections, as will (I hope) be for the Advancement of the Book, and the advantage of the Buyer; So wishing all prosperity to attend your Sailes; I rest,

Yours, HENRY PHILLIPES;

Phil. Nauticus.

The Sea-mans Kalender.



The SEAMANS Kalender.

Certaine Definitions, meer to be understood of those that will practise Navigation.

A Sphere or Globe is a round figure made by the turning of half a Circle, till it end where it began to be moved; or a massie body inclosed with one platfom or surface; In the middle whereof is a pitch, from which all Lines drawn to the surface are equal.

Center is the point or pitch afoze, in the middle of a Sphere, Globe or other Circle.

Diameter is a right line drawn throught the Center to the Circumference or surface of a Sphere or Circle, to each end thereof:

Circumference is a round Circle equally distant on all sides from the Center thereof.

Surface or Superficies is the upper part of any thing.

A Degree is the $\frac{1}{360}$ part of the Circumference of any Circle.

A Minute is the $\frac{1}{60}$ part of a Degree, being understood of measure; but in time, a Minute is the $\frac{1}{60}$ part of an hour, or the fourth part of a degree; 15 degrees answering to an hour, and 4 minutes to a degree.

The Pole is a point or pitch imagined in the heavens, whereof there are two; the North Pole being the Center to a Circle described by the motion of the North Star, or the tail of the little Bear; from which point aforesaid is a line imagined to passe through the Center of the earth, and passing directly to the opposite part of the heavens, thweth the South Pole.

The Equinoctial is a great Circle imagined in the heavens, also dividing the heavens into two equal parts, and lying just in the middle betwixt the two Poles, being in compasse from West to

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to East 360 degrees; every degree thereof on the terrestial Globe, valuing 20 English leagues, or 60 miles.

The Peridian is a great Circle dividing the Equinoctial at right Angles into two equal parts, passing also through both the Poles, and the Zenith: to which Circle the Sun comming twice every 24 hours, maketh the middle of the day, and the middle of the night.

Zenith is a point or prick in the Heavens right ober our heads 90 degrees from the Horizon, as the Pole is 90 degrees from the Equinoctial.

Nadir is a point or prick in the heavens under our feet, opposite to the Zenith.

Horizon is a great Circle dividing that part of the Heavens which we see, from the other part which we see not.

Azimuth is a great Circle crossing the Horizon at right angles, as the Peridians do the Equinoctial, being as many as the Peridians, and as the Peridians concur and meet together in the Poles of the World, so do the Azimuths meet in the Zenith, which is the Pole of the Horizon.

Parallels are Lines or Circles equally distant in all parts one from another, as all Circles of East and West are parallel to the Equinoctial.

Almicenteraths are Circles parallel to the Horizon, being also Circles of Altitude or Elevation, being that the Altitude of the Sun, Moon or Stars above the Horizon are described thereby: which Almicenters do crosse the Azimuth, as the Parallels or Circles of East or West do crosse the Peridians.

The Tropicks are two lesser Circles, parallel to the Equinoctial, limiting the bounds of the Zodiac, or the greatest declination of the Sun on each side of the Equinoctial. The Tropicke of Cancer Southward, and the Tropicke of Capricorn Southward, whose distance from the said Equinoctial are in these times according to the best Observations, 23 deg. and 31 min. scd.

The Zodiac is a great Circle, crossing the Equinoctial in two opposite places thereof, and swarbing byas-wise there-from, towards either of the Poles, touching the Tropicke of Cancer on the North

South part and the Tropick of Capricorn on the South part thereof. In the Zodiack are 12 Signes, viz. Aries, Taurus, Gemini, Cancer, Leo, Virgo, Libra, Scorpio, Sagittarius, Capricorn, Aquarius, Pisces, every Signe being 30 degrees in length, and 12 in breadth: Through which Signes the Sun passing describeth a Year, and the Moon passing likewise through the same maketh a Month: The 12 degrees that the Zodiack hath in breadth are allowed for the Latitude of the Planets.

Ecliptick is a Circle lying just in the middle of the Zodiack, out of which the Sun never goeth, but the Moon and other Planets are sometime on the one side & sometime on the other side thereof.

The head and tail of the Dragon are two opposite points in the Ecliptick line of the Zodiack, which goeth backwards through all the 12 Signes in 12 yeares: And when it happeneth that the Sun and Moon are in conjunction or opposition in that place of Ecliptick, where the head or tail of the Dragon is, then is the Sun or Moon eclipsed: Each of the other Planets also, have their proper Dragons head and tail; but this of the Moon is the most notable in regard of the Eclipses.

The Polar Circles are two little Circles distant from the Poles of the World so much as is the greatest declination of the Zodiack from the Equinoctial, in which Polar Circles are the Poles of the Zodiack. The one of these Circles being about the North Pole is called the Arctick Circle, the other being about the South Pole is called the Antarctick Circle. Some say these two Circles inclose all those Stars which neither rise nor set in any Latitude, but are always above the Horizon where either of the said poles are raised.

The Colures are two great Circles passing through both the Poles, crossing one another in the said Poles at right angles, and dividing the Equinoctial and the Zodiack into four equal parts, making thereby the four seasons of the Year, the one Colure passing through the Equinoctial points of Aries and Libra, the which the beginning of the Spring-time and Autumn, at which two times the dayes and nights are equal. The other Colure passing through the two Tropical points of Cancer and Capricorn, the which the beginning of Summer and Winter, at which two times the dayes are longest and shortest.

Altitude.

Altitude, in the Heavens, is the height of any thing above the Horizon towards the Zenith.

Latitude is the widenesse and distance of the Planets or Stars from the Ecliptick, either Northward or Southward. Also Latitude is the Distance of the Zenith of any place from the Equinoctial towards either of the Poles, which is alwayes equal to the height of the Pole of the same place.

Longitude, is length, and in the heavens it is understood the distance of any Starre or Planet from the beginning of Aries to the place of the said Planet or Starre, or from the beginning of any signe to a certain other part or degree of the same; Otherwile Longitude in the earth, is the distance of the Meridian of any place from the Meridian which passeth over the Isles of Azores, where the beginning of Longitude is said to be. Longitude is counted upon the Equinoctial and Latitude upon the Meridian.

Declination, is the declining or distance of the Sun, Moon or Stars from the Equinoctial, and is said to be North or South, according to the Pole towards which it leaneth.

Amplitude, is the distance of the rising and setting of the Sun, Moon or Stars from the true East or West points of the Compass upon the Horizon.

Ascension, is the rising of any Star, or of any parts of the Ecliptick above the Horizon. Right Ascension, is the number of degrees and min. of the Equinoctial, which commeth to the Meridian with the Sun, Moon, Starre, or any part of the Ecliptick.

Oblique Ascension, is the number of Degrees of the Equinoctial, which commeth to the Horizon with any Starre, or any portion of the Ecliptick: in which sort is Oblique Ascension also.

Ascensional difference, is onely the remainer, the one being subtracted or taken from the other.

The Golden number, or Prime, is the time of 19 years: in which time the Sun and Moon make all the variety of their Conjunctions, Oppositions, and other Aspects.

Epaq, is the 11 dayes and 6 houres, which are added to the year of the Moon, being 354 dayes, to make it equal with the year of the Sun, which consisteth of 365 dayes $\frac{1}{4}$. By the Epact is found out the Epaq, and by the Epact is found out the age of the Moon.

The

The Sea-mans Kalender.

5

ced according to their natural order of the Alphabet, yet in the peares they go backward: as if G be for one year, F shall be for the next; and when it is Leap-year, (which is every fourth year) then is there two letters for the year, the first serving from the 1 of January till St. Matthias day, which is then the 25 of February, and then the other letter takes place, and serves till the peares end.

To find which number of the Suns Circle, and consequently the Dominical letter for the year proposed; to the year of our Lord adde 9, that total divide by 28, and that which remaines is the Circle of the Sun for that year. Then to know the Dominical letter: Note that the 28 year the Dominical letter is A, and is the third from the Leap-year, therefore the first to begin withal, again, is G F, because it is another Leap-year: and so counting the 7 letters backward, and every fourth year counting two letters: That letter upon which the number of the Suns Circle ends shall be the Sunday letter for the year proposed. As for Example.

Let the year proposed be 1647, adde 9 thereto, and it makes 1656, that being divided by 28, the remainder is 4, the Circle of the Sun: then counting 4 letters backward, according to order, till I have counted four places, beginning with G F thus: 1 G F. 2 E. 3 D, &c. I find the fourth place ends upon C, which I conclude to be the Dominical letter for the year aforesaid. And it is the third after Leap year,

And here is to be noted, that the Prime and Dominical letter changes the 1 day of January, and the Epact the 1 day of March. To find out the Prime:

Divide the year of our Lord by 19, and to that which remaineth after the Division, adde 1: The product is the Prime number for all that year.

As for Example,

I would know the Prime for the year 1645, divide 1645 by 19, and you shall have in the Quotient 86, and after the division there rests 11, unto which if you adde 1, it makes 12, which is the Prime for that year 1645.

The Suns
Circle, &
Dominical
Letter.

1	G F
2	E
3	D
4	C
5	B A
6	G
7	F
8	E
9	D C
10	B
11	A
12	G
13	F C
14	D
15	C
16	B
17	A G
18	F
19	E
20	D
21	C B
22	A
23	G
24	F
25	E D
26	C
27	B
28	A

The Sea-mans Kalender.

To find out the Epact.

A Doe to the Epact of the year past 11, & if it passe 30, take away 30, and the residue is the Epact for all that year: but otherwise, which is the better way: I imagine three places upon your hand: which for Example let be the three joints of your fingers; and call or name the first joint 10, the second 20, the third 30, then count the Prime number upon the three joints aforesaid, and going over them until you come to the end of the said Prime number: mark upon which your Prime ends, and adding the number of the joint with the Prime, if they come not to 30, that shall be the Epact for all that year: if they passe 30, take away 30, and the remainder is the Epact, if it be just 30, then is the Epact equal to the Prime.

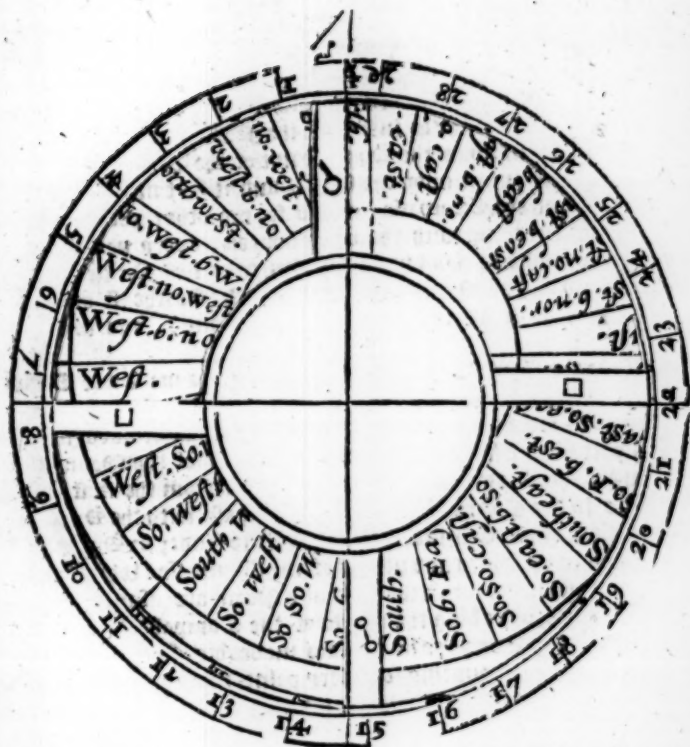
As for Example,

The year 1645, the Prime is 12, and imagining the first joint of my finger to be 10, the second 20, the third 30, I count upon the three joints 12, the Prime number, viz. upon the 1 joint I tell 1, on the second 2, on the third 3. Again, on the first 4, the second 5, and to 12, which is the Prime, ending upon the third joint, which I call 30, therefore adding 30, the number of the third joint makes 12 for the Epact of the year 1645 aforesaid.

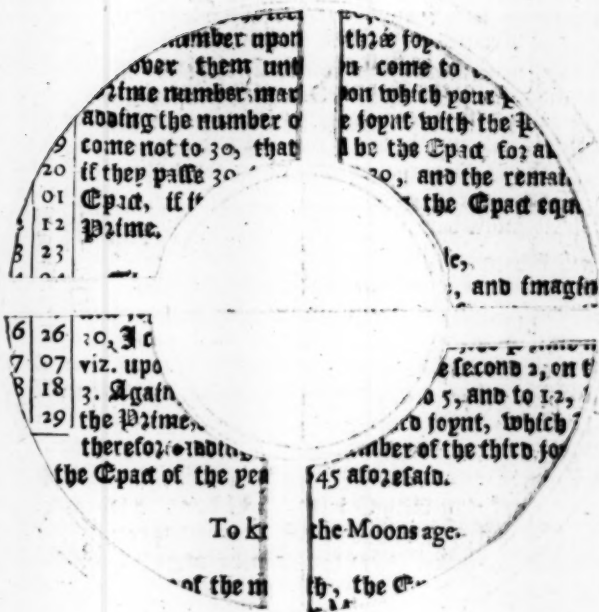
To know the Moons age.

A Doe to the day of the moneth, the Epact, and so many dayes more, as are moneths from March to the moneth you are in, including both moneths, and if they come not to 30, so much is the Moons age: But if they passe 30, take away 30, and the overplus is the Moons age.

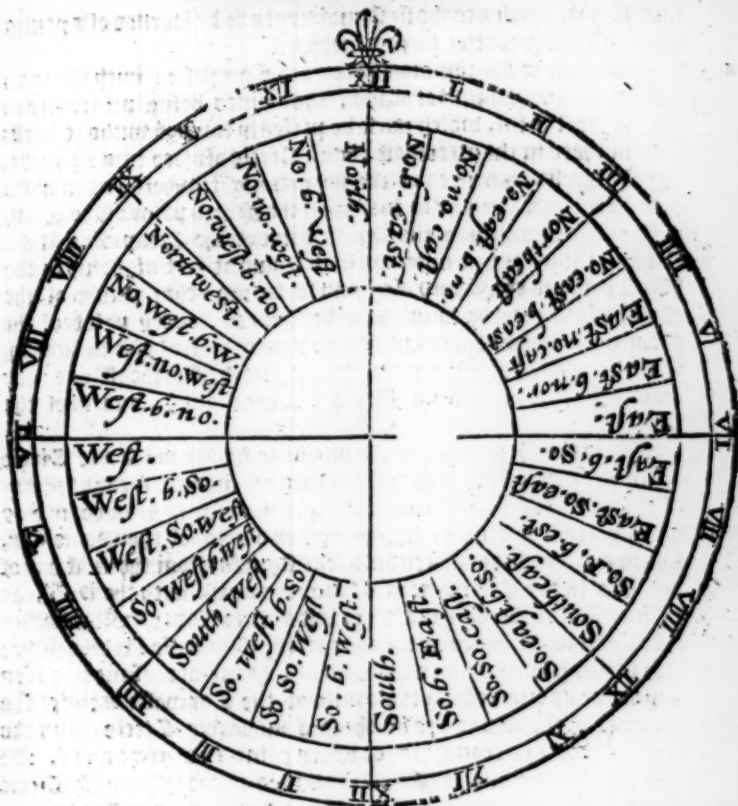
This is when the moneth hath 31 dayes, but if the moneth hath but 30 dayes, you must take away but 29, and the rest is the age aforesaid: for in those moneths that have 31 dayes, the Conjunction is the 30 day of her age, and those moneths that have but 30 dayes, the Conjunction is the 29 day of her age.



The four white quarters within the utmost Circle are to be cut out, and then the figure to be placed upon this Compasse following.



The four which are within the circle are to be placed upon the right hand side of the figure as follows



A Declaration of the former Instrument.

This Instrument gives you a plain and easie Order for the
 sitting of the Sun and Moon for every day of her Age: and
 also it is a ready and most necessary reckoning of the Tydes,
 whereby also is shewn the common Order, tiding thereby the
 32 points of the Mariners Compass to 24 Hours of the Day,
 and

and Night, which are the first rudiments to be learned of a young Scholar or Apprentice in Navigation.

First here is the common Partners Compass, with the xxxij points thereof plainly set down, the names being printed upon each several point, which must be perfectly learned without book; then is there in the uttermost edge a Circle divided into 24 parts, which signifie 24 houres of the day and night, where you may see that 12 a clock at night is just upon the South point of the Compass: 12 at noon upon the South point of the Compass: at 6 a clock in the morning upon the East, and at 6 at night upon the West point of the Compass, and so for the other points of the Compass agreeing with the other houres, every point of the Compass makes $\frac{1}{2}$ of an hour, as you may see South and by East is upon $\frac{1}{2}$ of an hour past 12, South Northeast one hour and $\frac{1}{2}$, Northeast and by South 2 houres and $\frac{1}{2}$, and so of the rest.

Also to the Center of the Compass is fixed a moveable Circle to turn round about the said Compass, the uttermost edge whereof moving close within the Circle of houres, is divided into 29 equal parts and a halfe, signifying the dayes of the Moons age, which are numbred in Arithmetical figures from the first day of her Age to her Conjunction or meeting again with the Sun, at which place of her Conjunction is left a little Index or Shewer, to direct you to the hours and points of the Compass: which Index also shews you how much the Sun and Moon are asunder every day of her age, by telling the points of the Compass betwixt the number of the Moons age in the said moveable Circle, and the Index thereof, accounting for every point 12 degrees and $\frac{1}{2}$. Or else the number of the houres contained in the uttermost Circle betwixt the said number of the Moons age, and the Index; accounting every hour for 15 degrees, shews the degrees of distance betwixt the Sun and the Moon.

Now for to keep reckoning of the Tides thereby, you must know by the Table hereafter set for that purpose how it shews: that is to say, what Moon makes full Sea or high water at that place where you would know the time of the Tide or high water for the day proposed: which known, you must also by the former Propositions, or else by the Kalender following know the Moons age, then

then seeking out the number of the Moons age in the moveable Circle, place the said number of the Moons age upon the point of the Compass which makes full Sea upon the change day at your place desired, and staying it there, the Index which is in the said moveable Circle, points you directly to the point of the Compass, that the Sun must be upon, when it shall be high water, on the foresaid day in the desired place, and also in the uttermost fixed Circle it shews the hour of the day which you desire.

As for Example; The first of January, 1645. I desire all this aforesaid: First, for the Moons age, because that the Epact changeth not till the first of March, I adde the Epact of the last year, before which is 12, and the day of the Moneth is 13. When January being the 11 Moneth from March, 11 added thereto, makes 24 for the Moons age the first of January 1645.

Again, to know how much the Sun and Moon are asunder, the Moon being 7 dayes old, I seek in the moveable Circle for the Moons age, which being 7, I place 7 upon the North point of the Compass, and the Index shews the East and by North, and $\frac{1}{2}$ to the Eastward, which is 7 points and $\frac{1}{2}$, that multiplied by $11 \frac{1}{2}$ the number of degrees that belong to a point of the Compass, makes 87 degrees, 32 min. for the distance betwixt the Sun and Moon, and in hours it shews $5 \frac{1}{2}$, which multiplied by 15 yeilds the like, being very nêr $\frac{1}{2}$ of the Zodiack.

Then for the Tides, at London-Bridg, it flows South-west and North-east, or is high water at 3 a clock on the Change day, therefore when the Moon is 7 dayes old, I place 7 the Moons age upon the point South-west, or 3 a clock, and staying in the moveable run-dle there, I see that the Index shews almost North-west, which is 40 minutes nearest hand, or nêr 3 quarters of an hour past 8 of the clock, at which time shall be high water at London-Bridg, the Moon being 7 dayes old.

Again, at Harwich where it flows South and by East, the Moon being 10 dayes old, I lay 10 (the Moons age,) upon that point of the Compass South and by East, and then the Index shews the point West North-west of the Compass, and in the Circle of hours $\frac{1}{2}$ of an hour past 7, which is the time of the full Sea at Harwich, the Moon being ten dayes old.

But if you want a Table or Instrument to work the Account of the Tides, you may do it by memory, multiplying the Moons age by 4, and divide the product by 5, and for the quotient add for every unit which remains upon your Division 12 minutes, that total add to the hour that it makes full Sea on upon the Change day, the Product shall be your desired number.

As in the former Example, The Moon 7 dayes old, and the High-water at London on the Change day at 3 of the Clock, I multiply 7 (the Moons age) by 4, it makes 28, that divided by 5, the quotient is 5, and 3 remaines upon the Division, which 3 being so many times 12 min. makes 36 min. which added to 5 in the Quotient, makes 5 houres, 36 min. that added to 3 the houres of full Sea, upon the Change day, makes 8 of the Clock, and 36 min. as aforesaid.

An exact way for the Tydes.

How necessary (nay of what necessity) the true account of the Tides are, every man that takes a charge (at least he that takes care of his charge) doth very well know; and yet no one thing (by most men) more grossely misberr'd over then this, for there is onely a general Rule used, as if all places were under the North Pole, where the Equinoctial is the Horizon, and that the departure of the Moon from the Sun were at all times equal; in both which respects the Rule is most grossely abused; for in North Latitude 51 degrees, 30 minutes, the Moon being in Cancer and having 5 degrees, North Latitude, it is 30 minutes past 10 of the Clock before the Moon will be Southeast, and at 30 minutes past one of the clock, the Moon will be Southwest, and for any point nearer to the East or West, the Error will be greater. Also, if it be in 30, or 40 degrees of Latitude, the error will be far greater.

The mis-account of which time from a high water, may cast away Ship and Goods, in going into a Harbour where water is scarce, where it is to be looked unto and respected. To correct this error, I will here propound a very exact, easie, and speedy way to account the tides.

First, You must understand, that in observing the Tides, the best way is to go by the time of the day shewed by the Instrument,

and not by the Moons being upon such a point of the Compass, my meaning is thus. The Table shews it is high tide at London, the Moon being S. west; and this by the Instrument is at 3 of the clock on the day of new or full Moon. Now it is true, that it is alwayes high tide at London at 3 of the clock on the day of the new or full Moon; but if you should observe the Moon in the Heavens by your Compass, you shall find, that y^e Moon is not alwayes South-west at 3 of the clock upon the day of new and full Moon.

For Example, At the new Moons in June, and the full Moons in December, the Moon is about the tropick of Cancer, and then in the Latitude of London, she is south-west at 3 quarters of an hour past 1 of the clock, but it is not high tide till 3 of the clock, and then the Moon will be W. South-west, which is two points further.

Also it is very necessary to observe the difference which is between the Spring-tides when the Moon is in the quarters, and the Spring-tides at the new and full Moon. For the Spring-tides will be an hour, and somewhat more, sooner then the Instrument both shew them. For Example, The Moon being in the first quarter, the Instrument shews that it is high tide at London, at 9 of the clock; but if you observe the time of the tide, you shall find that it is high tide before 8 of the clock. The like difference (I beleve) is in other places. Therefore to know the true time of the Tides, you must subtract some minutes from the time shewed by the Instrument, according to the age of the Moon, as is shewed by this little Table.

For Example. The Moon being 5 dayes old, it is high tide at London, by the Instrument at 7 a clock, but you must by this Table subtract 30 minutes from this time, and so the true time of the tide at London is at 6 of the clock, and 30 minutes.

The Moons age				H. M.	
1	14	16	29	Subtract	0 0
2	13	17	28		0 5
3	12	18	27		0 10
4	11	19	26		0 20
5	10	20	25		0 30
6	9	21	24		0 45
7	8	22	23		1 00

The Government of the Planets.

Others Writers have disagreed, concerning the Planetarie houres, some making the hours of the Planets equal with the

The hours of the clocks, and so continuing their Regiment orderly with the other common houres, some againe beginning the said Planetary hour at Noon, some at Midnight, and some againe at Sun-rising: Which indeed for the time of the beginning of the account is best, and for the difference of the equality and inequality between the Planetary hours, and the common hours of the clocks. Gemma Frisius agreeing with the best Astronomers, saith That as the days and nights do increase or decrease, so must the Planetary hours be longer or shorter accordingly, nevertheless, so that there shall be 12 Planetary hours in the Day and Night, as well as of other hours: but that if the day consist of more then 12 hours, then proportionably the Planetary hours to consist of more then 60 min. And if the day be lesse then 12 hours, then the Planetary hours, are to be lesse then 60 minutes: and if the Day be just 12 hours, then the Planetary hours are equal to the hours of the clocks, and not otherwise, The like is to be understood in the Nights, & to make an equality of the Planetary hours to them of the clocks, being $\frac{1}{2}$ how long soever the Day is, yet there must be but 12 Planetary hours, and how short soever the Day is, there must (nevertheless) be 12 Planetary hours, which are sometimes greater, and sometimes lesser then the common hours of the clock, which alwayes consist just of 60 minutes; therefore if you divide the day into 12 equal parts, one of those parts shall be the quantity of a Planetary hour, which you may do thus: Multiply the hours of the day into minutes, by 60, and if there be any odd minutes adde them to the Product, the total being divided by 12: the Quotient shewes the number of minutes contained in an unequal or Planetary hour.

And againe, if at any hour of the Day or Night, you know not what Planetary hour it is, that is to say how many Planets ruled since the beginning of the day or night proposed, Multiply the number of the hours past from Sun-rising by 60, and divide the Product by the number of the minutes contained in an unequal or Planetary hour, the Quotient will shew you how many hours and minutes of the Planets are past from the Sun-rising (if it be in the Day) or from Sun-setting, (if it be in the Night) which known, enter the Table following, to know what Planet rules that:

that day and hour proposed, looking for the hour desired in that column, which is right under the day proposed: those Planets which are Governours of the said hours in the day-time being placed on the side next the left hand, and the Governours of the night on the right hand.

Example.

The 17 day of May being Sunday, at 9 of the clock in the morning I would know what Planet rules? First, in the following Kalender, I find that the 17 of May the day is 16 hours long therefore I multiply 16 hours by 60 min. and the product is 960 That divided by 12, brings in the quotient 80 min. for the length of a Planetary hour at $\frac{1}{2}$ time, then from 4 of the clock (the time of $\frac{1}{2}$ Suns rising) till 9 a clock, the hour proposed is 5 hours

Governours of the Day	Sunday.	Munday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.	Governours of the Night
Sol	01	11	09	00	10	00	11	Jupiter
Venus	02	00	10	00	11	01	12	Mars
Mercur.	03	00	11	01	12	02	00	Sol
Luna	04	01	12	02	00	0	00	Venus
Saturn	05	02	00	03	00	04	01	Mercur.
Jupiter	06	03	00	04	01	05	02	Luna
Mars	07	04	01	05	02	06	03	Saturne
Sol	08	05	02	06	03	07	04	Jupiter
Venus	09	06	03	07	04	08	05	Mars
Mercur.	10	07	04	08	05	09	06	Sol
Luna	11	08	05	09	06	10	07	Venus
Saturn	12	09	06	10	07	11	08	Mercur.
Jupiter	00	10	07	11	08	12	09	Luna
Mars	00	11	08	12	09	00	10	Saturn

which multiplied by 60, brings 300, that divided by 80 (the length of a Planetary hour) brings in the Quotient 3 hours, and there remains upon the Division $\frac{2}{3}$ parts, that is three quarters of a Planetary hour more: so I conclude, that at 9 of the clock 3 Planets have past their Regiment, and the fourth hath ruled 3 quarters of his hour: Therefore under the title Sunday in the top of the Table, I look for 4 toward the foot of the said Table, against which on the left hand is placed Luna, therefore I say, that the 17 day of May being Sunday, at 9 of the clock in the morning, Luna shall have reigned 3 quarters of her hour.



A Rutter for the Courses round about

*Ireland, from Cape to Cape, and what Tide it makes
in every Harbour, and how many Leagues it is from
Harbour to Harbour.*

Ippilins, from Cape-Cleer to the Mison-head is 7 Leagues, and lieth West and by North, and East and by South, you shall find a Haven North-west from Cape-Cleer, called Crook Haven, and it floweth there East North-east, and West South-west; you must goe West to enter into it.

From the Mison to the Durzib, is 7 leagues, and lieth West North-west, and East South-east.

Bearc Haven lieth from the Mison-head, North north-west 3 leagues and a half, you must goe North-west into the Haven, it floweth E. north-east, and W. south-west: If you will anchor between the Durzib and the main land, you must go aboard the Island, for the East side is not sound.

The three Islands that be off the point of the Dourzies, which is called the Bull, the Cow, and the Calf, they be sound, and you may go within them, or else between them, for there is no danger but what you may see.

Dourzies and Balskey lie North and by West, and South and by East, and there is betwixt them 12 leagues, the Skellocks is between both, and it floweth north-east and south-west.

North-east off the great Skellocks, at 2 leagues off you shall find the entry of Vallens, you must run E. south-east to enter in, it floweth E. North-east; you must be row of the Island to enter in, for the point on the E. side is long.

North north-east of the great Skellocks 6 leagues off, you shall find the Haven of Ventry, which is a good Road: It floweth East north-east.

North

North-east by North off the great Skellocks 7 leagues, you shall find the Haven of Dingel, and without the Haven is a Rock called the Croo, which is found on both sides: The rock doth not cover but on a Spring-tide: You must run North-west, and by West into the Haven, it floweth E. northeast, and W. southwest.

The Ventry, and the Sound of Begue lieth South by East, and North by West 3 leagues, and when you are past into the Sound of Begue, you must lie East and by North into the Road against a red Clift, which is on the South side.

Southeast of the Sound of Blaskey, at 11 leagues off you shall find a good harbour, named Begue, which is to the Northeast off Valence: the said Haven hath two entrees, but the West side is the best: you must take great heed of a sunk Rock that is on the Islands side, which you must leave on your Larboard side going in, and it floweth East northeast, and West southwest.

You shall understand that the said Sound of Blaskey lieth South-east and North-west, but you must take heed of a Shoale, that is on the East side, athwart the Sezebras.

From Blaskey to Smirrick is 3 leagues, and if you enter into the Haven you must go Southwest into it: it floweth East northeast and West southwest.

There is a Hill to the Eastward of Smirrick, which is called Sinbrandon, goes from Smirrick East northeast, and you shall goe with Lopus-head, which maketh entree of the River of Limeric, on the North-side: there is from one to the other 10 leagues.

Smirrick, and the head of the Kerry, lie East northeast, and West southwest, 7 leagues asunder, and there is within the Bay three Islands called Salline.

From Lawphead to the Seaties, is 7 leagues, the lie E. S. E. and W. S. W. and if you enter into the River, take heed of a Shoale half way between Lawphead, & an Island called Scarrick, which you must leave on the South side, and to the Eastward of that Island is a good road: It floweth E. S. E. and W. southwest.

From Scarrick to Quoive, is 5 leagues, you must goe East, and you shall find two Islands, they be flat Islands, go to the Northward side above them, and from thence runne E. North-east

cast, and you shall find a Rock called the Bieff, go hard aboard the South side of the said Rock, called the Bieff, and when you are at the said Rock, you must row Southeast, and you shall find another Rock called the small Bieff, then go with the Island of the entry of Dorley, and borrow aboard the Island as nêr as you can, for fear of the bank going into the Haven, and you must moor at the Castle by four Cables, for there goeth a great tide, it floweth East Northeast, and West South-west.

The Sound of Blaskey and the Islands of Arrin, lieth North Northeast, and South South-west, and there is betwêen them 16 leagues: the Islands lie East and West, and makes the entry of Galloway, and of the other Islands: there is one which is naught: but the West Sound is good, and the next Sound to it is good, which is called the little Sound, but the Sound coming from the East is naught: but the next coming to the Blackshore from the East is partly good, but you must put the two partitions to the Island, for it is dangerous: You must understand that there is one Island in the course way betwixt Lawpshead & the entry of Galloway, that hath a great Ranche, a league and a half off the main land.

If you go before the Town of Galloway, go aboard the Blackshore, and bring the Blackshore South-east of you: then go North-east and you shall fetch the Island, called Motton Island, and there is between them both three leagues: You must not trust to the North-shore, for there is a shoal half way to the Blackshore, and the Island of Motton is thwart of two white points, which is on the North side.

The said Shoal is upon the West South-west side of the said Island of Motton, a league and a half off at a spring tide, then shall you see it day, and it floweth at the said Island East Northeast, and West South-west.

The Sound of St. Gregory, and the Road of Galve, lieth East Northeast, and West South-west, & there is betwixt them 8 leagues.

The Sound of St. Gregory and Silvish-head, lie South east and North-west, and the distance betwixt them is 9 leagues.

Slinthead and Sark lieth North by West distant 15 leagues.

Black-rock is an Island which is West of Kil-head, a league off

off the Cape, and the said Black-Rock, and the Stags lieth North-east, and by North, and are distant 12 leagues.

From the said Black-rock run North, and you shall find the Islands of Cast Eaves, and there is between them 2 leagues.

Southsouthwest of the Stags, there is a Haven called Broad Haven, from the Haven to the Stags is two leagues: Stags is a Cape that maketh the entry of the River of Raffen, they lie East and West, and are distant 8 leagues: the Stags and Cape of Tellen lie North-east and South-west, and are distant 15 leagues.

Between the Stags and the Cape of Tellen in the Bay, is the Haven of Moy, the Haven of Portway, the Haven of Slego, the Haven of Baleshanen, the Haven of Dongal, the Haven of Kellekeg, and the Haven of Tellen.

The Cape of Tellen, and the Island of Arrond, lie North North-east and South South-west, and are distant 7 leagues.

The Island of Raghlenburn and Tellen, lie South-west & North-east, and are distant 2 leagues.

The Island of Raghlenburn and the Island of Torre, lie North-northeast, and South South-west, and are distant 14 leagues.

To the Eastward of Torre, is a Cape called Horn-head, and are distant two leagues: Southeast of Horn-head, is a Haven called Sheep-Haven, it floweth East and West, but you shall have in the Bay a good Road for all winds; the said Haven is a broad Haven, and is two leagues from the Cape.

Horn-head and the entry of Lough foil, lie East North-east and West south-west, and are distant 6 leagues.

The entry of Lough-foil, and the Island of Enersterhould, lieth North-east and South-west, and are distant 5 leagues.

The Island of Torre and the Island of Enersterhould, lieth East and by North, and West and by South, and are distant nine leagues.

The entry of Lough-foil and Enersterhould, lie Southeast and Northwest, and are distant 5 leagues.

The Isles of Enersterhould and Skirris Portrush, lie East south-east, and West north-west, and are distant 10 leagues.

You must understand, that the River of Lough-foil, lieth from

from Skirris Portrush, West South-west, and East North-east, and there is between them the River of the Band: There is between Portrush and Loughfoil 5 leagues: There is in the entry of Loughfoil, a sand which is called the Tonnes, which is dangerous for any ship of charge: Also there is a Channel on the East side of the Tonnes, hard aboard the Woze, but you must have your Tide: It floweth East by South, and West by North. Skirris Portrush and it lies South and North, and are distant 12 leagues.

Skirris Portrush and the Islands of the Raghlings lie North-east and by East, and South-west by West, and are distant 5 leagues: it floweth in Skirris East south-east, and West North-west; the sound commeth from the Eastward.

Off the Raghlings is a Cape called the fair Forland, and betwixt them is a League and a half: the fair Forland and the Knee lieth South South-east, and North North-west, and are distant nine Leagues.

The fair Forland and Loughrian in Scotland, lie East South-east, and West North-west, and are distant 15 leagues.

There is betwixt the Knee and Carick vergus 5 Leagues.

The point of Loughrian, and the Islands of Commoras, off Scotland, lie North and South; you must passe by Elliso, and by the Haven of Lambach, asunder 7 Leagues.

The point of Loughrian and Compnam Isles, lieth North-east and South-west.

The Knee, and the Rock of the Maidens, lie North-east by North.

The Knee, and Else in Scotland, lie North-east by east, distant 10 Leagues.

Loughrian in Scotland, and the Mounds of Galue, lie South South-east, and North North-west, and are distant 7 Leagues.

The Mounds of Galue, and the Calf of Man, lie South South-east, and North North-west, and are distant 10 Leagues.

The Compnam Isles and the Road Carick vergus, lie East and West, and are distant 14 Leagues: it floweth in the sound East South-east, and West North-west.

Compnam Isles, and the point of the Moulens, lie South South-east, and North North-west, and are distant 7 Leagues.

The

The point of the Moulins and the Isle of Lambay, lie South South-west, and North north-east, and are distant 21 Leagues.

Lambay and Carlingford, lie North north-west, and South South-east, and are distant 18 Leagues.

Lambay and the Isle of Dalke lie South South-west, and North north-east, and are distant 3 Leagues.

The bank of VVicklo, beginning thwart of the North of Dublin, and continues to the Isle of Tosker, they lie North by west, and South by east, and they lie in length 24 Leagues.

Tosker and the point of the Grenord, lie East and by north, and West and by south, distant two Leagues.

And when you are bound to the Eastward off the Grenord, you must keep the Mountaine of VVashford above the low land, and so you shall go clear of all the dangers betwixt you and the Shore: And if you close the Point with the low land, then you shall go with the dangers.

Tosker and the Cape of Canwal, lie South by east, and North by west 40 Leagues.

Tosker and the Salts lie East north-east, and West South-west, distant 6 Leagues.

The Salts and Silly lie South and North, and are distant 33 Leagues.

The Salts and the tower of Waterford, lie East and West, and are distant 5 Leagues.

The tower of Waterford and the Isle of Ballecutin, lie South-west by west, and North-east by east; but between the tower of VVaterford and Ballecutin is a Haven called Yoghall; and a sea-board it is an Island called Capel-Isle, and between Capel-Island and Ballecutin is 4 Leagues.

The tower of VVaterford and Helvick-head, lie East and West, distant 3 Leagues.

Capel-Island, and the Island of Ballecutin, lie West South-west, and East north-east, and are distant 3 Leagues and a half.

Ballecutin and Cork Haven lies West by south, and East by north, and are distant 3 Leagues and a half.

Oyster Haven, and the Head of Kinsale, lie South-west and North-east, distant 3 Leagues and a half.

The Haven of Kinsale lieth from the Old head, North North-east; and going in, you must keep Bive Castle open of the West-land.

The Old-head, and Cape Clear lie West by South, and East by north, and are distant 14 leagues.

Cape Clear and Silly lie East southeast, and West northwest, distant 50 leagues.

There lieth from Fasten a Haven called Crocke Haven, and is from it North-west, distant 4 leagues.

There is a Haven called Scol Haven, which lieth from Fasten North and by west, distant 5 leagues.

There is a Head-land half way betwixt the Old head of Kinsale and Baltemore, which is called Kerdonetedo, and it lieth North-west by west, from it is a good haven called Cleador, there is a High-land to the Eastward, you must go above that High-land, and so into the Haven. There is a Range of Rocks on the West land that goeth to the Eastwards; Theretore keep the East side, and when you come in, Anchor before the Castle: There lieth West North-west from the said Head, a good Haven called Castle-haven, 4 leagues from it; and if you come out into the sea, and meet with the Stags, you must go North-east into Castle-haven, and in the entry there is an Island, which you must leave on the East side of you, & another flat Island, which you must leave on the West side of you; you may go dry at low water from it to the main, for it is very nigh to the West land, but be bold on the Easter Island, and go right with a Chappel that lieth on the East side of the main land, and when you are thwart of the Chappel you shall see a Castle on the West side, and thwart of the Castle you may enter in 12 fatham, it is from the Stags three leagues and a half.

You must understand, that the flood shoots from Dourze, to the Old-head of Kinsale, North north-east, and the ebb to the contrary, and from the Old-head to the Tower of Waterford North-east and South-west, and from the Dourze to the Southwards, North north-east, and South south-west.

If you will go in betwixt the Cash and the North-head of the grounds

grounds in Dalky, you must bring a round hill that stands like a sugar-loaf *S.* *Northeast*, and you shall have ten fathom: It floweth southeast alongst the Channel, and the Bar of Poulback, there is eight foot water upon it at low water, and three fathom at full Sea: your Bar lieth South and North, and you shall have in the Road at Poulback, fourteen foot at low water.

To sail from Dalky to the Road of Poulback, you must keep a small Rock open, a hand-spike length, and when you come to the Bar, you must lie West south-west up into the Road within the Beacon, then must you anchor in four fathom at high water, for there are two Hills on the south side, a high Hill and a low round Hill, bring them both in one, and then you be in the best of the Road. A south southeast Run makes a full Sea.

A Note for going into Milford.

If you come from Milford, you must leave all the Islands to the Westward, and when you have the Grashom North North-west, then the Haven beareth Northeast by North, and when you come into Dall Road, you may ride in three fathom and a half at low water, it floweth East by North.

Milford goeth in close under Cowein and Scabon, to the Eastward, and when you come open of Milford, you shall see an Island like the Mawstone, which lieth on the East side; and in Dall road you may ride for all winds; the Small lieth from the Grashom three leagues, and between them lieth a Leg of Rocks, which is dry at low water; it lieth mid-way, and it is very dangerous coming between them.



A general and compendious Tide Table,
 shewing what Moon makes full Sea, or High Water
 in all these places following.

Full Sea on the Coasts of *Zutphen, Frizeland,*
Holland, Zeland, and Norway.

A t the Jutlandish Isles, before the Rivers of Hever, Filder and Elve,	S and N	Upon the Flats of West Frizeland, Wyering, and Amsterdam, SW
At Enkhuysen,	S and N	Without the banks of Flanders, SW
The Isle of Urke, before Delfe		Dordrecht and Zierick sea, SW
Isle, at Embden, and all the		Rotterdam, and from Harlem to
Moors of Flanders,	S and N	the River of Maes, SW
Before the Maers Deep,		At Wardhouse, E and W
	E and W	At Brihac, E S E
At Hambrow and Antwerp,		Cape Gallant, S by E
	E and W	The havens of Yotland and Norway, S and N
Underneath Holyland,	W S W	At Corpus Christi Point, S S W
At Egmont and Harlem,	S E	Before the Fen in the Channel
In the Bresond and Vourde,	W S W	at Horn, Edam, Isle of Gore,
Before the Eastern and West-		before the Maes, before Cam-
ern entrance of the Ems, or		fer, and Terver, S S W
river of Embden, before all the		Before the Willing, and all the
coast of Frizeland, and the Fly,	E S E	coast of Zealand, S S W
Before the Ghest of Texel,		North-Cape and Blangbrow, SW
	W S W	Fox-Nose, and St. Nicolas road, W S W
		Full

Full sea on the Coast

of France, Spain, and
Portugal.

At Blacknesse, Armuy, Ram-
mekins, and Camfer,

S.S.W.

Within the Fosse of Caen, S.S.E.

Calice-road and Diep, S.S.E.

At Bolein, Calice, Gravelin, and

Dunkirk half tide, S. and N.

The Island of Basse, S.E.

Within the Seyn, before the Cas-
quets, and before Garnsey,

S. E.

Before Cherborough, & the Rase
of Blanquet, S. and N.

At Newport, half tide, S. and N.

At Seyn-head, S.S.W.

At Garnsey, and before Poule,
W. by S.

Bell Isle, and Holy Isle,
S. W. by S.

Without Ushant, and before Bur-
deaux, E. and W.

Brittain, Penmark, Poitou, and
Gascoign, S.W.

Rase of Fontnes, W. by W.

Bloy and St. Machews, W. by S.

Before the Killiats, S.W.

Portwise, and before the River of
Burdeaux, S.W.

From the Rase to the Pole-head,
S. W.

Before the River of Naunts, and
before the Bay, S.W.

In the Bay within Ushant,
W.S.W.

At the Sept-Isles, and at Calice,
in the Creek, W.S.W.

Within the River of Roan, and
from the Pole-head of Burde-

aux to the Forland of Fountains

before Brovage, in the River

within all the Havens afoze-

said, it floweth S.W. by W.

At St. John de Luze, S.S.E.

At Concalo and St. Malo,
E. and W.

At Cape St. Maries, E. by E.

On all the Coast of Biskay, Ga-
lasia, Portugal, and Spain, it flow-
eth Southwest and Northeast.

Scotland.

In St. Magnes Sound, S.E. by E.

At Fair Isles, S. E.

In the Frith, S.S.E.

Fair Isle Roads, S. by E.

At Orkney, S. E.

England.

At Barwick it flows, S. S. W.

At the Staples half tide,

N. E. by E.

At Howncliff-foot, half tide,

N.E. by E.

At

At Flambrow-head one quarter-tide	E N E	Between Bridlington and Lawrenas,	W S W
At the Shoo,	S and N	Between Lawrenas and Cromer,	
At Tinmouth a quarter-tide,	S W	along the Well, half tide,	E and W
At the Sporne,	W by S	Between Cromer, & Yarmouth road,	S E
Newcastle and Humber,	W by S	Between Laitho road, and Orfordness,	S E by S
Winterton,	E S E	Between Orford, and Orwell waters,	S S E
Black-rail, and the Nowre,	S by W	Between the Naze, & the Ware-head of Colne,	S by E
Blackney & the Shields,	E and W	At the West end of the Nore,	S by W
Yarmouth,	S E by E	Rochester and Maldon,	S by W
Oxford and Albrow,	S E by S	At Gravesend,	S S W
Whitbay, and Robin-hoods Bay,	S W	London, and the midst of the Heads or Straights,	S W
Before Hartlepool,	S W	At the North Forelands,	S S E
Scarborough one quarter tide,	W S W	At Beachy,	S and N
Hull and Lin half tide, E and W		Seven Cliffs,	S E
Before Humbers mouth, N W		In the Downes,	S S E
At Burnham one quarter tide,	E and W	In the Camber, and at Gore-end,	S by E
Cromer	S E	At Camberness, and at the Needles,	S E by S
At Liestow a quarter tide, S S E		In Camberness Road,	S S E
Harwich and Dover,	S S E	Portsmouth, Hampton, and the Isle of Wight,	S and N
Harwich withis,	S by E	In the Offing from the North Forland, to the South Forland,	
South Forland,	S S E	it runneth half tide, and from the South Forland to the Naze, it runneth half tide, and half quarter tide,	
Before Margate and Thames-mouth,	S by E		and,
Leigh and Kentish knot	S and N		
Spits, and along the Swine,	S and N		
Between Tiamouth and Flambrow-head,	S W		
Between Flambrow-head, and Bridlington Bay,	S W by W		

and from the Nassy to Fairly
one half tide, and from Fairly
to Beacy, one quarter tide tim-
ber other

At Portland Road, ESE

At St. Erens, SE by E

Within the Race of Portland,

At Poole in the Haven: At
Home-head, and thwart of
Plymouth and Dartmouth,

SE

At Weymouth E and W

At Falmouth, Foy, Fourne, Plim-
mouth, and Dartmouth, W by S

Bristow and Foulness, E by S

At the Start, E by S

Moshole, W S W

St. Davids-head, E and W

Milford-haven, ESE

Off of Man and Carnes, SE

Three leagues off the Shore, at

the Lizard to the Shore, and to

the Lands-end, ESE

Within Torbay, and in the Bay

of Canarven, W by S

At the mouth of Severn, W by S

At the Moonles, W by S

From the Lizard to the Sorlings

W by S

Before Silly in the Channel,

E and W

At Silly half tide, S S W

Within Mounts Bay, and in
the Sea of Wales and Severne,

W S W

At Lundy and the Holmes of

Bristow, E and W

In the Sleeve, between Silly and

Ushant, S and N

Note that the flood sets not in

at the East end of Wight, till

a Southeast Moon; in the Road

of Dungeness, South south-

east: But without in the Chan-

nel a Southwest Moon makes

full Sea: from the Seames and

in the broad Sound between

it and Ushant, the flood run-

neeth East North-east, and

West South-west.

Ireland.

At Caldy, W by S

Waterford & Abermorick,

E and W

At Cape Cleer, ESE

Machnells Castle, SE by E

Dublin and Lambay, SE by E

Dunbar and Kidlien, SE

Dungarum, Kinsale, Cork Haven

and Balemore, W & W

At Flambrow-head one quarter-tide	E N E	Between Bridlington and Lawrenas,	W S W
At the Shoo,	S and N	Between Lawrenas and Cromer,	
At Tinmouth a quarter-tide,	S W	along the Welsh , half tide,	E and W
At the Sporne,	W by S	Between Cromer, & Yarmouth road,	S E
Newcastle and Humber,	W by S	Between Laitho road, and Orfordness,	S E by S
Winterton,	E S E	Between Orford, and Orwell waters,	S S E
Black-rail, and the Nowre,	S by W	Between the Nasse, & the Ware-head of Colne,	S by E
Blackney & the Shields, E and W	S E by E	At the West end of the Nore,	S by W
Yarmouth,	S E by S		
Oxford and Albrow,	S W	Rochester and Maldon,	S by W
Whitbay, and Robin-hoods Bay,	S W	At Gravesend,	S S W
Before Hartlepool,	S W	London, and the midst of the Heads or Straights,	S W
Scarborough one quarter tide.	W S W	At the North Forelands,	S S E
Hull and Lin half tide, E and W		At Beachy	S and N
Before Humbers mouth, N W	E and W	Seven Cliffs,	S E
At Burnham one quarter tide,		In the Downes,	S S E
		In the Camber, and at Gore-end	S by E
Cromer	S E	At Camberness, and at the Needles,	S E by S
At Liestow a quarter tide, S S E	S S E	In Camberness Road,	S S E
Harwich and Dover,	S by E	Portsmouth, Hampton, and the Isle of Wight,	S and N
Harwich with in,	S S E	In the Offing from the North Forland, to the South Forland, it runneth half tide, and from the South Forland to the Nasse, it runneth half tide, and half quarter tide,	and
South Forland,	S by E		
Before Margate and Thames-mouth,	S and N		
Leigh and Kentish knot	S and N		
Spits, and along the Swine,	S W		
Between Tinmouth and Flambrow-head,	S W		
Between Flambrow-head, and Bridlington Bay,	S W by W		

and from the Nassy to Fairly
one half tide, and from Fairly
to Beacy, one quarter tide in-
der other

At Portland Road, ESE

At St. Erens, SE by E

Within the Race of Portland,

At Poole in the Haven: At
Home-head, and thwart of
Plymouth and Dartmouth,

SE

At Weymouth E and W

At Falmouth, Foy, Fourne, Pli-
mouth, and Dartmouth, W by S

Bristow and Foulness, E by S

At the Start, E by S

Moshole, WSW

St. Davids-head, E and W

Milford-haven, ESE

Off of Man and Carnes, SE

Three leagues off the Shore, at
the Lizard to the Shore, and to
the Lands-end, ESE

Within Torbay, and in the Bay
of Canarven, W by S

At the mouth of Severn, W by S

At the Moonles, W by S

From the Lizard to the Sorlings
W by S

Before Silly in the Channel,
E and W

At Silly half tide, SSW

Within Mounts Bay, and in
the Sea of Wales and Severne,

WSW

At Lundy and the Holmes of
Bristow, E and W

In the Sleeve, between Silly and
Ushant, Sand N

Note that the flood sets not in
at the East end of Wight, till
a Southeast Mon; in the Road
of Dungeness, South south-
east: But without in the Chan-
nel a southwest Mon makes
full Sea: from the Seames and
in the broad Sound between
it and Ushant, the flood run-
neth East Northeast, and
West Southwest.

Ireland.

At Caldy, W by S

Waterford & Abermorick,

E and W

At Cape Cleer, ESE

Machnells Castle, SE by E

Dublin and Lambay, SE by E

Dunbar and Kidlien, SE

Dungarum, Kinsale, Cork Haven
and Balemore, W & W

The Course of all the Coasts of *Holland*,

Zealand, France, and Spain, upon what Points,
and what distance they are.

From the Isle of Texel unto Egmont,	S and by W. leagues 5
From Egmont unto the Maze,	S S.W. l. 11.
From the Maze unto the Wicling,	S.W. l. 21.
From the Wicling unto the head of Straight between Dover and Calice,	W.S.W. l. 8.
From the Isle of Walkeren or Flushing unto Calice,	S.W. and by W. l. 22.
From Blacknesse unto Deep,	S.S.W. l. 12.
From Deep unto Seyn-head or the River of Seyne,	W.S.W. l. 11.
From the Seyn-head to the River of Cane,	S.W. l. 8.
From thence unto Cape de la Hague,	N.W. l. 12.
From thence unto the Caskets,	W. and by N. l. 18.
From the Caskets to Garnsey,	S.W. and by W. l. 4.
From the Caskets to St. Malo,	S.E. l. 10.
From Garnsey to the Sept Isles,	S.W. and by S. l. 12.
From the seven Isles to St. Powle	W.S.W. l. 8.
From thence to the Fourne,	W. S.W. l. 10.
From the Caskets to the Fourne,	S.W. and by S. l. 34.
From the Fourne to St. Matthews point,	S.S.E. l. 3.
From thence to Foutenau, or Founteynes,	S. and by E. l. 5.
From Ushant to the Seames a Sea-board it,	S. l. 7.
From Foutenau to the west Penmarques,	S.E. l. 7.
From thence unto the Isle of Croy,	E and by S. l. 12.
From the West Penmarques to Bell-Isle,	E.S.E. l. 15.
From thence to Heys somewhat more Easterly,	S.E. l. 12.
From thence again until within Piquillier,	E. and S. l. 10.
From thence again unto Croysil,	E. and by S. l. 9.
From Piquillier unto Heys,	S. and by W. l. 5.
From Heys to the Killiars,	E.S.E. l. 10.
From the Isle of Heys to Porthuis,	S.E. and by E. l. 12.
From	

The Sea-mans Kalender.

29

From S. Martins Island to the Burning Isle,	S. and by E. 1.3.
From the Burning Isle to the Oyſter bank,	S.S.E. 1.3.
From St. Martins Isle to the Tower of Cordam,	S. and by E. 1.12.
From thence unto Bayone,	S. and N. 1.28.
From Bayone to Orio,	W.S.W. 1.5.
From Orio unto St. John de Luz,	E.S.E. 1.6.
From Orio unto St. Andrew,	W. and by S. 1.20.
From St. Andrew unto Cape de Pennas,	E. and W. 1.30.
From Cape de Pennas to Ribadeo,	S.W. and by W. 1.12.
From Cape de Pennas to Ortegál,	W. and by W. 1.20.
From Ortegál unto Ribadeo,	E. 1.14.
From Ortegál unto the Isle of Cizaega,	S.W. and by W. 1.13.
From Cizaego to Coronna,	E.S.E. 1.6.
From thence unto Cape Coriana	W.S.W. 1.10.
From Coriana to Cape Finiſterre.	S. and N. 1.3.
From Finiſterre unto Bayone,	S.E. and by S. 1.14.
From Bayone unto Port de Port,	S.S.E. 1.18.
From Port de Port to Aveiro,	S. and N. 1.8.
From Aveiro to Montega,	S.S.W. 1.5.
From Montega unto Barlings,	S.W. 1.11.
From Barlings unto Roxende,	S. and by E. 1.12.
From Roxende unto St. Uves point,	S.E. and by S. 1.8.
From thence unto Cape of St. Vincent,	S. and N. 1.24.
From thence unto Pharo,	E. and W. 1.14.
From Pharo unto Lepe,	N.E. and by E. 1.12.
From Pharo to Saltees,	E.N.E. 1.18.
From Saltees to Chipiona,	S.E. 1.8.
From Chipiona to Calis Mális,	S.E. 1.6.
From Calis unto the ſtraight of Gibraltar,	S.E. 1.8.
From Calis unto Cape de Cantin,	S.W. and by S. 1.60.
From Cape de Cantin to the Isle of Madera,	W. 1.104.
From St. Vincent to Madera,	S.W. and by W. 1.115.
From Roxende to Madera,	S.W. 1.30.
From Roxende to the Isle of Tercera,	W. 1.210.

E

The

The Courses of *England, Ireland,* and *Scotland.*

From Becknes unto Leith in Scotland	S. S. W. 1. 28.
From Leith unto Barwicke,	S. S. E. 1. 8.
From Barwicke unto the Holy Isle,	E. S. E. 1. 4.
From St. Abbes-head to the Eastern end of Farne Isles,	S. E. 1. 6.
From the Isles of Farne to the Tees-mouth,	S. S. E. 1. 16.
From the River of Tees to Flambrow-head,	S. E. & by E. 1. 14.
From Flambrow-head to Blackney,	S. E. 1. 8.
From Blackney unto Winterton,	S. E. 1. 8.
From Winterton unto Lestofse,	S. & by E. 1. 8.
From Lestofse unto Orford Haven,	S. 1. 7.
From Orford unto the Foreland,	S. S. E. 1. 13.
From the Foreland to Dover,	S. 1. 5.
From Dover to the Shingles, or the Nesse point,	S. W. & by W. 1. 7.
From the Nesse point unto the Beache,	W. S. W. 1. 6.
From the Beache to the Isle of Wight,	W. & by S. 1. 5.
From Wight unto Portland,	W. & by S. 1. 10.
From Portland to the Start point,	W. S. W. 1. 14.
From the Start unto Ram-head point,	W. N. W. 1. 6.
From Ram-head unto the Dodmans point,	W. S. W. 1. 8.
From Dodmans to the Lizard point,	S. W. & by W. 1. 6.
From the Lizard to the Isles of Silly,	W. 1. 12.
From the Lizard to the Lands-end,	W. N. W. 1. 8.
From the Lands-end to the Isle of Lundy,	N. E. 1. 14.
From thence unto the Holmes of Bristow,	N. E. & by E. 1. 16.
From thence unto the Isle of Caldy,	W. S. W. 1. 15.
From thence to the Isles of Salteys, on the Coast of Ireland,	W. N. W. 1. 20.
From Salteys to Cape-cleer,	W. S. W. 1. 15.
From Cape-Cleer to the Isle of Dorsey,	W. 1. 12.
From the point of Dorsey to the Isle of Blakem,	N. N. W. 1. 16.
From Blakem unto the Isles of Arrant,	N. N. E. 1. 14.
From the Isles of Arrant to Galwicke, or the Gulfe in Ireland	E. N. E. 1. 6.

OF

Of divers and sundry Courses over the Western Sea.

From the Texel on the Coast of Holland to Flambrough,	N.N. W.1.45.
From Texel unto Winter ton in Norfolk,	W.1.32.
From the Isle of Texel unto Leistoffe,	W.& by S.1.28.
From the River of the Maze in South Holland, unto Harwich,	W.1.26.
From the said Maze to the Foreland of England,	W S W.1.25.
From the Marisdeep in North Holland to the said Foreland,	S. W.1.36.
From the said Marisdeep to Calice,	W.& by S.1.38.
From Dover unto Bulloign,	S. E.1.8.
From Bulloign unto the Beache,	W.1.16.
From the Beache to Deep in Normandy,	S. E.1.18.
From Deep unto the Isle of Wight,	E. S. E.1.28.
From Wight to the Seyne-head or mouth,	S. E.1.20.
From the said River of Seyne to Portland,	W.N. W.1.30.
From the Isle of Wight unto the Caskets,	S.W.& by S.1.14.
From Garnesey unto St. Malo in Normandy,	S.S.E.1.8.
From the Caskets to Portland,	N.and by W.1.10.
From the Caskets to the Start point,	W.N.VV.1.16.
From the Start to the Sept-Iles in Normandy,	S.S.E.1.24.
From the Start to St. Poul in Normandy,	S. and by VV.1.21.
From St. Poul to Portland,	N.E. and by N.1.32.
From the Fournes to Ramhead	N.N.E.1.28.
From the Start point unto Ushant,	S.VV. and by S.1.32.
From the Fournes to the Lizard,	S.and N.1.22.
From Ushant to the Isles of Silly,	N.N.VV.1.26.
From the Sorlings to Milford Haven,	N.and by E.1.25.
From the Sorlings to VVexford in Ireland,	N.N.VV.1.34.
From the Sorlings to Cape Cleer,	N.VV.1.42.
From Cape Cleer to Cape Finisterre,	S.and N.1.130.
From the Lizard to Cape de Finisterre in Galizia,	S.S.VV.1.122.
From	

The Sea-mans Kalender.

- From Ushant unto the Isle of Cizarga in Galizia, S.S.W. 1.85.
 From Ushant to Laredo in Biscay, S.S.E. 1.85.
 From the Seam Rocks to St. Sebastian in Biscay, Southeast and by
 S. leagues 10.
 From Ushant again to Cape de Pannas in Biscay, S. and N. 1.70.
 From Belik unto Ortegal in Galizia, S.W. 1.75.
 From St. Martins Isle to Ortegal, W S.W. 1.85.
 From Ortegal to Cape de Coriana, S.W. and by W. 1.24.
 From Cape de Finisterre to the Isles of St. Michael, W.S.W. 1.185.
 From St. Michael to the Isle of Tercera, N.W. 1.26.
 From Cape de Finisterre to the Isle of Madera, S.W. & by W. 1.190.
 From Madera unto the great Isle of Canary, S.E. and by E. 1.60.
 From Cape de Finisterre to the Isle of Barling, S. and N. 1.50.
 From the Barlings in Portugal to the Isle of Canary, S.S.W. 1.170.
 From the Isle of Madera to Calis Malis, E.N.E. 1.150.
 From Calis to Cape de Cantin, S.W. and by S. 1.65.
 From Cape de St. Vincent unto Cape de Cantin, S. and N. 1.62.
 From Cape de St. Vincent unto the Isle of Madera, Southwest
 and by W. 1.120.
 From Roxand in Portugal, unto the Isle of Tercera, E. & W. 1.210.

The Courses of Norway, Swethland, and East-Finland.

- From Schuytenes to the Vesteen, S. and by E. 1.4.
 From Vesteen or Wostone to the Jeddor, S.S.E. 1.4.
 From the Jeddor to the Vorsteen or Forstone, S.E. 1.5.
 From the Forstone to the Noes, E.S.E. 1.6.
 From the Noes unto Reperwicke, E.N.E. 1.8.
 From Reperwicke, to Mardon, N.E. 1.10.
 From Mardon unto Jofferland, N.E. 1.8.
 From Jofferland to Langhesondt, N.N.E. 1.1.
 From Langhesondt to Ferderoer, N.E. and by E. 1.6.
 From

From Ferderoer unto Soen water,	N.I.6
From Ferderoer unto Roeghe,	N.N.E.1.4.
From Ferderoer unto Akerfoud,	E.N.E.1.6.
From Akerfoud to Maesterland,	S.E. and by E.1.4.
From Pater nofter to Nydrinke,	S.E.1.8.
From Nydrinke to Waersbergh,	S.E. and by E.1.4.
From Waersbergh to Swederoer,	S.S.E.1.6.
From Swederoer unto Col,	S.S.W.1.3.
From Col unto Lapsland,	S.E.1.3.
From Lapsland unto Ween,	S.S.E.1.2.
From Ween to Drakeriffe,	S. and by E.1.7.
From Drakeriffe to Steeden,	S. and by W.1.4.
From Steeden to the North end of Bornholm,	E. and by N.1.15.
From Bornholme unto Anno,	N. and by W.1.8.
From Anno unto the Rockes,	N.E.1.8.
From the Rockes until within the Calmerfoud,	N.N.E.1.10.
From Calmerfoud to the Sweedish Jonckfrow,	N.N.E.1.8.
From Jonckfrow to Landfoort,	N.N.E.1.8.
From thence until before Dury-haven,	N.E. and by E.1.8.
From the Stockhomes Shares to View of Abo,	N.E. and by N.1.24.
From View unto Luns Uefchares,	E.N.E.1.28.
From Uefchares to the Ifle of Putfagto,	E. and by N.1.30.
From thence unto Somere,	E. and W.1.9.
From Somere unto the Red-hole of Wiburg,	N.E.1.9.
From the Red-hole unto Traelfand,	N.E. and by N.1.2.
From thence unto Wiburgh,	leagues 2.

The Depth and Soundings, neer divers Provinces. And first of *Gascoigne,* *Poictu,* and *Brittaine.*

Without the River of Burdeaux, there is 14 fatham depth, but when you come within the sight of Cordam Tower 30 fatham.

Ober against the Coast of Poictu, 16 leagues without Oleron you have 35 fatham, but coming néer the land 8 leagues from the shoer, you have 35 fatham: In the Channel between Porrhuis and Heys, it is 30 fatham, and as much in the Channel of Heys, as also between Heys and Belile, without the Channel is 35 fatham, but within 25: without Heys, two kennings off, there is sound 45 fatham.

Twenty two leagues Southward off Belile, is 70 fatham, but 9 leagues from the South-west point of that Island; towards the south-west is 60 fatham: and ober against the mist of Belile in 40 fatham depth, you shall see land. In your Course between Belile and the Seames, you must come no néerer then 50 or 45 fatham, if you sail from Belile West and by North: when you are against Gloyland, you shall find 60 fatham depth without, and within the Rock which stands off Gloyland, to the Sea-wards, you have 40 fatham water: in 60 fatham depth without the West Penmarkes, you may sail North-west by west without the Seames, but by night come no néerer then in 55 fatham, for the ground is grosse and red sand, and full of red slints: half a league West south-west of the Seames, is a ledge of Rocks, where you have seven fatham depth, but between the Seames and the Rock is 50 fatham.

In the Channel between the Seames and Ushant, is 55 fatham depth, the ground is grosse and red sand, with little round stones red and black: near to Ushant is 45 fatham, but within it is of a variable depth: South-west almost 17 leagues off Ushant, you have 70 fatham, and the ground is fine white sand, with little white shels, and other small things like needles, and then is Ushant

Ushant East from you : but if the land be grosse and white, mingled with great and white Shells, then it is Southeast to you : but if you doubt of these Grounds go Northerly if your Sound be deeper, then are you towards the Seames, but if not so deep, then are you in the Channel almost South of Ushant.

Between Ushant and Obverack, in the trade, it is 60 fatham depth, between Ushant and the Sorlings in the midst of the Channel there is 73 fatham, between the Seames and Ushant, in 70 fatham water, the ground is of little black Stones easie to be broken and of yellow earth and clay : but if you find red and hard sand, go Southward, till you happen on white sand mingled with long strokes, and then you are in the Channel.

If from Cizarga you sail South northeast in the Spanish seas toward Ushant, and find your self in 80 fatham, you are 14 or 15 leagues off Ushant, but coming nearer you shall have 70 fatham water, and be 10 leagues from Ushant, but if you find the ground to be yellow Shells, and little black Stones, then are you towards the Seames, therefore you must with the tide, bear off Southward; to than Ushant until you find white sand, and things like needles, so; such are the grounds of the Channel.

Between Ushant and the Ile of Bale, when you sail at 4 fatham water, you are 4 leagues off the Shore, but by night come no nearer then 25 fatham. When you are two leagues off Obverack, you shall find 25 fatham depth, but 8 leagues off the Sept. Islands you have 55 fatham.

A league without the Rocks of Obverack, there is a blind or hidden Rock : so that if you were to sail upon a boro between the Fourns and Obverack, come no nearer the blind Rock than 40 fatham; but Eastward you may sail in 30 or 25 fatham.

If a ship sailing West S. W. and Southwest by W. off Silly, at 80 fatham water, be found to be under 49 degrees, 15 minutes of Altitude, she is 26 leagues from Land, and must go East and by South, till she get 66 fatham water; for then she is in the Channel between Silly and Ushant, and then if she be bound for England, she must sail more Southward, and between the Lands end and the Lizard, she shall have 55 fatham depth.

The

The Soundings and Grounds between *Ireland,*
England, and Normandy.

Three Leagues without the Isles of Dorsey, néer Ireland, it is 45 fatham déep: In the Channel between Dorsey and Cape cleare, is 42 or 43 fatham, the Channel from Cape-clear to Saltees, hath 45 fatham, but two leagues off Ireland it hath but forty; between Saltees and Milford, it is 44 fatham déep, and between Lundy and Silly: is 38 fatham. In the mid-way between Silly and Milford is 44 fatham, but North of Silly 40 and 42, and néer England, by the Lands-end the Channel is of 50 fatham déep.

Coming from Cape Finisterre, sapling S. S. E. if you have 80 fatham, you are 20 leagues off the Shore: and the ground is smal black stones with great red sand: in the same course, when you have but 60 fatham: you are within 12 or 14 leagues off the Shore, but shall not soon kenne land, as you think so: you shall a great while have 60 fatham: being at the S. parts of the Channel about Silly, between Ushant and silly, the Channel is 70 fatham: on the South side of Silly the ground is smal red stones, and fine white sand: over against the Lizard, and Falmouth four leagues from Shore is 52 fatham: betwixt Foy and Plimouth sound: in the Channel nighest is 60 fatham between the Lizard and the start, bear no néerer the Shore than 35 fatham, you may cast Anchor in the Trade or Channel in 25 fatham, and so you shall lie within the Foreland Stream: Between Plymouth and the Sept-Iles, in the middest of the Channel 55 fatham, but 4 leagues S. S. W. off Plymouth, is but 35 fatham S. S. E. off the midland of the start is 45 fatham, but from thence 5 or 6 leagues S. E. is 54 fatham: in the Channel between the Caskets and Portland is 40 fatham, 4 a league North off the Isle of Aldernay, is a shoal or pit 80 fatham déep, all the rest of the Channel between Portland and Aldernay, is of equal depth, viz. 40 fatham: when you are within kenning of Portland, your sounding is 34 fatham: and two leagues off Wight 36 fatham: also two leagues Eastward of Beachy, between Picardy and Wight, the Channel
in

in the midst is 28 fatham: between Winchelsey and Pleadry is 24 fatham, the Shoals between the head called the Urowenland, hath but 3 fatham and a half, but on the South-side of it is 24 fatham: and in all the safe way between Zeeland and Dover, it is 24 fatham deep.

Depths of the North Sea from the Foreland.

In the Channel from England, Foreland, and sands of Flaunders you have 24 fatham deep: but 3 leagues South West by West, off the Countrey of Zierickze, called Botbrecke, it hath but four fatham depth without the Shoale, the Channel of Zeeland, is 26 fatham *N. W.* off Harlem, 8 or 9 miles within the Sea, there beginneth a shelfe called De breede Verthien, reaching alongst the Coast of Holland, to the plain of Ameland, where it endeth: Dover against Harlem and Egmont is 13, 14, or 15 fatham, and the ground is full of Wase, mingled with black sand like Mustard-seed: the said shelfe hath 15, 16, or 17 fatham depth: Between Texel and Ulyeland, where the ground is grosse red sand, 6 or 7 leagues from the Shore, so there the Shoale is narrower then it is toward the South end of the Channel: without the Shoale between Zeeland and Texel is 26 fatham deep, as farre as the Shoale which the Fishers call Dog-sand. In the Channel on Englands side over against Yarmouth is 35 fatham, but against Flambrough and Scarborough point 38 fatham, whereas the white shelfe called Dog-sand beginneth reaching into the North Seas to the Channel of Helichland, this Shoale (where it is within kenning of Flambrough point) hath but 9 or 10 fatham, but when in the same Sand you find 12 fatham, then Texel is from you Southeast almost 30 leagues, but when you come to 16 fatham, then are you within 21 leagues, Southsoutheast of Ulyeland.

A Ship that comes from the Risse, finding 18 fatham depth, on the aforesaid sand, is then 29 leagues South and by East of Ulyeland, but at 22 fatham you must then sail towards the Uye, South and by West, and South Southwest, but if in the Channel of Helichland, 14 or 26 fatham be found, then must you sail

S

South

Southwest, and South-west by South; and then you come to the Schelingsh, but if in Hell-chland Sound, you have 27 fatham, then are you altogether to the Eastward of it: between the Riffe and the Doggerland, the Channel is 26 fathams: without the Channel Westward, it is 32 fatham deep.

A Ship that comes out of y^e English Straits, or out of Zealand, having at the Riffe 24 fatham, is from the Naes in Norway, 18 leagues South and by East, but having 20 fatham is but 16 leagues from it South, and finding but 18 fatham, is then 18 lea. off it South by West: The course from thence to the Holmes is 12 leagues South by East: from thence to the point of Schagens, is 18 leag. South-east by E. there is a Rock of one fatham depth. South-east, & South-east by East off the Helmes 2 leag. from thence.

Depths neer Jutland and Ameland.

In the Sea without Jutland, a mile from Dodenbergh, is a bank called Reece horne, stretching out 8 leagues West by South, in some places but three fatham deep, and in some places may be sayled over, and become a Road for a South-west, and a South wind in 20 fatham: From Ameland towards the Sea, the ground is grosse sand, red and black mingled with shells: thence Southward in 16 fatham sayling three houres, you shall come to the smooth Sea of Ameland, where the ground is fine sand with shells: South from Schelingsh in 24 fatham, is fine white sand, and in 8 fatham white and black sand mingled, Ulyeland, hath white sand with shells, and thin black sand in 16 fatham depth: From the West end of Ulyeland is great and red sand mingled with black like unto Mustard seed: about six or seven leagues from thence at the East end of Schelingsh, to Sea-wards at 18 fatham, is fine white sand mingled with black, having in it things like needles. Over against Borke in the Westerne Ems at 17 or 18 fatham depth: land may be seen: the ground grosse gravelly sand: At 14 fatham may Ameland be ken'd, but Schelingsh at 16, and Ulyeland, at 15 or 16 fatham water. At the South Hook of Texel, land may be seen at 16 fatham. Holland at 14 or 15. When you sail within the Shoals called the Breduir-thein,

thein, which beginneth South-west of Harlem, and stretcheth along the coast of Holland, to the west end of Ulyeland, it is 7 or 8 leagues from the shore.

Soundings and Grounds neer the Schaw.

A Great league West by North from the Schaw is 35 fathom depth: North Northeast a great league off the corner of this point is 38 fathom, and when the point is Northeast from you, then you have 17 fathom. Betwixen this point and Leson the Channel is 20 fathom deep, and the ground like clay or dirt; Betwixen Anhout and Waersbergh, in the midst of the Channel is 22 fathom water: Betwixen Leson and Anhout, the ground is fine and stony: neer Waersbergh to a shoal of 17 fathom deep: Betwixen Anhout and Col is another shoal of 17 fathom, where sometimes it is troublesome like a Whirlpool.

Depths of the Eastern Seas.

Betwixen Oeland and Gothland, the Soundings are unequal, sometimes of 20: sometimes of 23 fathom, the ground grosse, and black stony sand like Pease: When the Southend of Oeland is 2 leagues from you westwards, you have 27 fathom, where also you may gage water, but when the Cappel of Sudernoorden beareth West north-west off you, then have you 1 fathom and ground fit to gage water, Over against the Rock in the fair way is 52 fathom, and a clay ground, but fit for gaging: Betwixen the greater and lesser Carca is 14 fathom, under which is a safe road for ships, there is a shoal betwixen Houghbergh and Otergard 24 fathom depth, the ground great sand, but hardly from thence can you ken Gothland out of the fog: there is also to the Eastward another shoal of 36 fathom, which when you are past, you have more then 40 fathom water: when the point of Righ is three leagues Southeast from you, then have you 30 fathom, but when it is from you halfe a league South southeast, you have but 15 fathom, and the ground is white sand: but when it beareth East a small league from you, then you shall have 16

fathom : Ober against Heel halfe a league from the Shoze, it is almost 3 fathom deep : the road for Ships at Heel hath 25 fathom depth : Between Moan and Falsterbourn is 14 fathom depth : between Stead and Falsterbourn in the very Channel, is but 12 fathom deep : near Falsterbourn it is full of Shoals, but near Stead you have 13 fathom water : between Dark-riff and Southoimen which is more Shoalop, there is 5 fathom wanting two foot from thence towards the Sound, it is something deeper then 6, 7, 8, 9, 10, 11 fathom.

A Note of certain and most dangerous places in the Sea.

The principallest and most perillous of all is the Mael-Stream well or Slorp, called the Mousk-Stream : which lieth on the backside of Norway in 68 degrees on the north side of an Island or Rock called Weeray. This Well draweth the water unto it self, during the whole flood, (which is the space of 6 hours, and 12 minutes) with such an in-draught and force, and with such a noise through the tumbling and falling of the waves and streams one upon the other, that it is rather to wonder at, than to write of : So that during that time, within the space of more than two leagues, round about that Rock of Mouske, (under which that water floweth) no ship or other vessel may come near, for they should to their utter destruction be drawn into it, and swallowed up, but all the time of the Ebbe, the water is so strongly cast up again, that no kind of substance or Metal, how heavy soever it be, can there sink : So that our Northern Fishers at that time with their Tollen or fishing Boats take many and strange sojmed Fishes, which they draw into their Boats with Hooks and Lines, which they have ready laid for that purpose : so that during the Ebbe, they cannot return into the Gulph, nor get under water by any means.

The Northern people that inhabit about those Rocks, do think that Stream passeth away underneath a part of Norway, under the North bottom in East Finland, because that in that place there is likewise such a Mael-Stream, (though not altogether

so strong nor dangerous, where the like fishes are taken, and the water is in like sort troublesome, as it is underneath and above the Rock of Mouse.

Whereupon many experienced Pilots do call the said Sloop, The navel of the Sea, which causeth the courses of the Ebbes and Floods about all the Lands that are on the North side of the Equinoctial, as the most convenient place for that purpose, to spread the waters South, North, East and West: that is to say, Northerly towards the Pole of Artick, South Easterly on the backside of Russia and Tartaria, and toward the Straight of the great South Sea called *Mar-del-zur*, wherein the Spirits of Islands (called *Moluccas*, near the Equinoctial) are lying Southward the North Sea of these Low-Countries: As also on the backside of Scotland and Ireland, towards the Spanish and Atlantick-Seas, and towards the South-west beyond Island, towards Fro-bishers-straight, where it is thought the way unto Cathay may be found.

There are moreover to be feared upon the Western Seas, very dangerous Streams and Gulphs, as in the Race of Portland, where oftentimes happeneth such turning and tumbling of Waves and Streames, that the Ships which passe that way, are many times in great peril.

Moreover, the Race of Branquert, between Normandy, and the Isles of Alderney, roareth and rageth, and so dangerously, that many Ships fall therein head-long so deep, that suddenly they are swallowed up, and sunk to the very bottome.

The race of Founney is more dangerous then all these, wherein many small Vessels and Barks of Bricany, and of other Countries, are suddenly devoured and cast away: and the entrance of the Garrone, called the River of Burdeaux, between the Towers of Cordam, and the Southern and Northern Asles is likewise very perillous, and many Ships do often perish there, if the Pilots be not skillfull and well acquainted with the place.

And therefore being the most full of danger, it becometh each Pilot or Master to have especial knowledge thereof; and great care to prevent the danger that may ensue unto them thereby.

The four Terms.

Hillary Term, begins January 23, and ends February 12.

Easter Term, begins 17 days after Easter day, and ends the Monday before Whitsunday.

Trinity Term, begins next Friday after Trinity-Sunday, and ends on Wednesday 19 days after.

Michaelmas Term, begins the 23 of October, and ends November 28.



A brief explication of the several parts of this following
Kalender or Ephemerides.

THe first page contains an Almanack for 24 years to come, shewing the Prime, Epact, Sunday-letter, Leap-year, and all the principal moveable Feasts.

The following leaves shew the 12 moneths of the year in their order, and each moneth is divided into several columnes or spaces, which are alike in all the moneths.

In the first, is set down the Prime.

In the second is set down the hour and minute of the New Moon for 19 yeares following.

In the third, the day of the moneth.

In the fourth, the Sunday-letter, whereby you may know the day of the Week.

In the fifth, is set down the names of the fixed Feasts, and other dayes of note, and in the void places between them is set down the time of the Sun-rising and setting at *London*.

Then followeth 4 Sections, each one consisting of three Columns where is set down the Longitude and Declination of the Sun in the Meridian of *London*, for the years 1658, 1659, 1660, 1661.

Unto this *Kalender*, is added the *Gregorian* or *Forreign Account* for every moneth.

Here-

Hereafter followeth a most excellent, necessary and compendious Kalender, shewing the Prime, Epact, Dominical Letters, Leap-years, and moveable Feasts, for 24 years, inclusively comprehending therewith the true day and hour of the Moons Conjunction, or Change, for 19 years to come, with the true place of the Sun and his Declination from the Equinoctial, both Northwards and Southwards upon every degree thereof, through the twelve moneths of the year.

The English Account.										Forreign Account.	
Years of our Lord	Prime	Epact	Dominical Letter.	Sunday	First Sunday in Lent	Easter day.	Whitsunday	Easter day.	Whitsunday	Soone then our	Weeks
657	5	25	A		Feb. 15	Mar. 29	May, 17	Apr. 1	May, 20	1	
658	6	6	B		Febr. 28	Apr. 11	May, 30	21	June, 9	0	
659	7	17	C		20	3	22	13	June, 1	0	
660	8	28	A	G	Mar. 11	22	June 10	Mar. 28	May, 16	5	
661	9	9	F		Marc. 3	Apr. 14	June, 2	Apr. 17	June, 5	1	
662	10	20	E		Febr. 16	Mar. 30	May, 18	9	May, 28	0	
663	11	1	D		Marc. 8	Apr. 19	June, 7	Mar. 25	May, 13	5	
664	12	12	C	B	Febr. 28	Apr. 10	May, 29	Apr. 13	June, 1	1	
665	13	23	A		12	Mar. 26	May, 14	Apr. 5	May, 24	0	
666	14	4	G		Marc. 4	Apr. 15	June, 3	25	June, 13	0	
667	15	15	F		Febr. 24	Apr. 7	May, 26	10	May, 29	1	
668	16	26	E	D	9	Mar. 22	10	1	May, 20	0	
669	17	7	C		28	Apr. 11	May, 30	Apr. 21	June, 9	0	
670	18	18	B		Febr. 20	April, 3	21	6	May, 25	1	
671	19	29	A		Mar. 12	23	June, 11	Mar. 29	May, 17	5	
672	1	11	G	F	Febr. 25	7	May, 26	Apr. 17	June, 5	0	
673	2	22	E		Febr. 17	Mar. 30	May, 19	Apr. 2	May, 21	1	
674	3	3	D		Marc. 8	Apr. 19	June, 7	22	June, 10	1	
675	4	14	C		Febr. 21	4	May, 23	14	June, 2	0	
676	5	25	B	A	12	Mar. 26	14	5	May, 24	0	
677	6	6	G		Marc. 4	Ap. 15	June, 3	Apr. 18	June, 6	1	
678	7	17	F		Febr. 17	Ma. 31	May, 19	10	May, 29	0	
679	8	28	E		Mar. 9	Ap. 20	June, 8	Mar. 26	May, 14	5	
680	9	9	D	C	Febr. 28	11	May, 30	Apr. 21	June, 9	0	

January hath xxxi. dayes.

January hath xxxi. dayes.														
The Prime.	New Moon.	The time of the H.M.	Month-day.	Week-day.	The English Kalender.	First year, ☉ in Capricorn				Diff. of Decl.	Second year, ☉ in Capricorn			
						Suns rising H.M.	Suns setting H.M.	1661. Longi D.M.	Suns Decl. D.M.		1662. Longi D.M.	Suns Decl. D.M.		
8	23 24	1	A	N. years day	1	21 59	21 43	10	1	21 45	21 46			
		2	B	7 59 4	1	23 1	21 33		2	22 46	21 36			
16	12 6	3	C	7 58 4	2	3 24 2	21 23	11	3	23 47	21 26			
5	24 47	4	D	7 57 4	3	4 25 3	21 12		4	24 48	21 15			
13	20 56	5	E	7 56 4	4	5 26 4	21 1	12	5	25 50	21 4			
		6	F	Twelfth da		6 27 6	20 49		6	26 51	20 52			
	2 9 37	7	G	7 53 4	7	7 28 7	20 37	13	7	27 52	20 40			
		8	H	Lucian 4	8	8 29 8	20 24		8	28 53	20 27			
10	5 46	9	I	Sun in Aqu.	9	9 30 9	20 11	13	9	29 54	20 14			
18	18 27	10	C	7 49 4	11	10 1 10	19 58	10	10	55 20	1			
		11	D	7 48 4	12	11 2 11	19 45	14	11	1 57	19 48			
7	14 36	12	E	7 46 4	14	12 3 12	19 31		12	2 58	19 34			
		13	F	Hillary	16	13 4 14	19 16	15	13	3 59	19 19			
15	3 17	14	G	7 43 4	17	14 5 15	19 1		14	5 0	19 5			
4	15 58	15	H	7 41 4	19	15 6 16	18 46	15	15	6 1	18 50			
		16	I	7 40 4	20	16 7 17	18 31		16	7 2	18 35			
12	12 7	17	C	7 39 4	21	17 8 18	18 15	16	17	8 3	18 19			
1	24 48	18	D	7 37 4	23	18 9 19	17 59		18	9 4	18 3			
9	20 57	19	E	7 35 4	25	19 10 20	17 43	17	19	10 5	17 47			
		20	F	Fabian 4	26	20 11 21	17 26		20	11 6	17 30			
17	9 38	21	G	Agnes 4	28	21 12 21	17 10	18	21	12 7	17 14			
		22	H	Vincet 4	30	22 13 22	16 52		22	13 8	16 56			
6	5 47	23	I	7 29 4	31	23 14 23	16 35	18	23	14 9	16 39			
14	18 28	24	C	7 27 4	33	24 15 24	16 17		24	15 9	16 21			
		25	D	Con. of Paul		25 16 25	15 59	19	25	16 10	16 7			
3	7 10	26	E	7 23 4	37	26 17 26	15 40		26	17 11	15 44			
		27	F	7 22 4	28	27 18 26	15 22	19	27	18 12	15 26			
11	3 18	28	G	7 20 4	40	28 19 27	15 03		28	19 13	15 7			
19	16 0	29	A	7 18 4	42	29 20 28	14 43	19	29	20 13	14 48			
		30	B	7 16 4	44	30 21 29	14 24		30	21 14	14 28			
8	2 8	31	C	7 14 4	46	31 22 29	14 4	20	31	22 15	14 9			

Third year in Capricorn		D of Decl.	Leap year in Capricorn	
Suns Long.	Suns Decl.		Suns Long.	Suns Decl.
D.M.	D.M.		D.M.	D.M.
1	31 30	21 48	1	31 15 21 51
2	22 31	21 38	2	22 16 21 41
3	23 32	21 28	3	23 17 21 31
4	24 33	21 18	4	24 18 21 21
5	25 34	21 7	5	25 19 21 11
6	26 35	20 55	6	26 20 21 01
7	27 36	20 43	7	27 21 20 51
8	28 37	20 31	8	28 22 20 41
9	29 38	20 18	9	29 23 20 31
10	30 39	20 5	10	30 24 20 21
11	1 40	19 51	11	1 25 19 51
12	2 41	19 37	12	2 26 19 41
13	3 42	19 23	13	3 27 19 31
14	4 43	19 9	14	4 28 19 21
15	5 44	18 54	15	5 29 18 58
16	6 45	18 39	16	6 30 18 48
17	7 46	18 23	17	7 31 18 38
18	8 47	18 7	18	8 32 18 28
19	9 48	17 51	19	9 33 18 17
20	10 49	17 35	20	10 34 17 55
21	11 50	17 18	21	11 35 17 39
22	12 51	17 1	22	12 36 17 22
23	13 52	16 43	23	13 37 17 5
24	14 53	16 25	24	14 38 16 47
25	15 54	16 7	25	15 39 16 30
26	16 55	15 49	26	16 40 16 13
27	17 56	15 31	27	17 41 15 53
28	18 57	15 12	28	18 42 15 35
29	19 58	14 53	29	19 43 15 16
30	20 59	14 33	30	20 44 14 57
31	21 00	14 14	31	21 45 14 38

South Declination decreasing.

THE
Foreign Account.

And
The Southing of the Stars
just at Midnight.

Each star is set down just against the day when it comes to the South at midnight: By which you may see what stars are in observation, and at what time of the night. For the stars before, come to the South so much before midnight, and the stars after, so much after midnight as they are distant in dayes; allowing one hour for 15 dayes, and 2 hours for a month.

Conversion of Paul.
South Arms of the Crab.
(138 M.)

FEBRUARY.
Purification of Mary.
Hydra's Heart 7.12 S.

The Figures following
each star, shewes the degrees and minutes of Declination, N. North. So. South.

February hath xxviii. dayes.

The Prime.	New Moon.	The time of the Month.	Month-day.	Week-day.	The English Kalender.		First year, in Aquarius.		Second year, in Aquarius.	
					Suns rising	Suns setting	Suns Long	Suns Short	Suns Long	Suns Short
					H.M.	H.M.	D.M.	D.M.	D.M.	D.M.
			1	D	7 12 4 48	1 13 30 13 44	20	1 13 15 23 49		
	16 050		2	E	7 12 4 51	2 14 31 13 24		2 14 16 13 39		
	5 1331		3	F	7 12 4 54	3 15 31 13 420		3 15 17 13 9		
	13 940		4	M	7 12 4 55	4 16 32 13 43		4 16 17 13 48		
	2 2221		5	T	7 12 4 55	5 17 32 13 23	21	5 17 18 13 27		
			6	W	7 12 4 57	6 18 33 13 1		6 18 18 12 6		
	10 18 30		7	T	7 12 4 59	7 19 33 13 40	21	7 19 19 11 45		
			8	W	Sun a Pife.	8 20 34 13 19		8 20 19 11 24		
	18 7 12		9	T	6 57 5 3	9 1 34 10 57	25	9 1 10 11 2		
			10	F	6 55 5 530	10 2 34 10 30		10 2 20 10 41		
	7 3 20		11	D	6 53 5 7	11 3 35 10 14	25	11 3 20 10 19		
	15 16 01		12	M	6 51 5 9	12 4 35 9 32		12 4 20 9 57		
			13	T	6 49 5 11	13 5 35 9 30	23	13 5 21 9 35		
	4 4 42		14	W	Valentines	14 6 36 9 7		14 6 21 9 19		
			15	T	6 46 5 14	15 7 36 8 45	23	15 7 21 8 58		
	12 00 50		16	E	6 44 5 16	16 8 36 8 22		16 8 21 8 28		
	1 13 32		17	F	6 22 5 18	17 9 36 8 0	23	17 9 21 8 6		
	9 9 41		18	D	6 40 5 20	18 10 36 7 37		18 10 22 7 43		
	17 22 23		19	M	6 38 5 22	19 11 36 7 14	23	19 11 22 7 20		
			20	T	6 36 5 24	20 12 36 6 51		20 12 22 6 57		
	6 18 31		21	C	6 34 5 26	21 13 36 6 28	23	21 12 22 6 34		
			22	D	6 32 5 28	22 14 36 6 5		22 14 23 6 11		
	14 7 12		23	E	6 30 5 30	23 15 36 5 41	23	23 5 22 5 48		
	3 19 54		24	F	Patricias	24 16 6 5 18		24 16 22 5 24		
			25	M	6 26 5 34	25 17 36 4 51	23	25 17 22 5 1		
	11 16 2		26	T	6 24 5 36	26 18 36 4 32		26 18 22 4 38		
			27	W	6 22 5 38	27 19 6 4 8	23	27 19 22 4 14		
	19 4 44		28	T	6 20 5 40	28 20 35 3 45		28 20 21 3 53		

When it is Leap year February hath 29 dayes, and then
 March is upon the 25 day.

February

Third year.				Leap year.				THE	
☉ in Aquarius				☉ in Aquarius.				Foreign Account.	
Suns		Suns		Suns		Suns		And	
Long.		Decl.		Long.		Decl.		The Southing of the Stars	
D.M.		D.M.		D.M.		D.M.		Jult at Midnight.	
1	23	1	13 34	10	1	22 46	13 59	11	☉
2	24	1	13 34	2	2	23 47	13 39	12	☉
3	25	2	13 13	20	3	4 47	13 19	13	☉ Lions heart 13.36 N.
4	26	3	12 23	4	4	5 48	12 58	14	☉
5	27	3	12 53	21	5	6 48	12 38	15	☉ Lions neck 25.5 N.
6	28	3	12 12	6	6	7 49	12 17	16	☉
7	29	4	11 51	22	7	8 49	11 56	17	☉
8	30	4	11 30	8	8	9 50	11 34	18	☉
9	1	5	11 8	23	9	10 51	11 13	19	☉
10	2	5	10 46	10	10	11 51	10 51	20	☉
11	3	6	10 24	22	11	2 51	10 30	21	☉
12	4	6	10 3	12	12	3 51	10 8	22	☉
13	5	6	9 43	23	13	4 52	9 46	23	☉
14	6	6	9 19	14	14	5 52	9 24	24	☉
15	7	7	8 56	23	15	6 52	9 2	25	☉
16	8	7	8 33	16	16	7 52	8 39	26	☉
17	9	7	8 11	23	17	8 52	8 17	27	☉
18	10	7	7 48	18	18	9 52	7 54	28	☉
19	11	7	7 25	23	19	10 53	7 31	29	☉
20	12	7	7 3	10	20	11 53	7 9	30	☉
21	13	7	6 40	23	21	12 53	6 45	31	☉
22	14	7	6 16	10	22	13 53	6 22		
23	15	7	5 53	23	23	14 53	5 59		
24	16	7	5 30	10	24	15 53	5 35		
25	17	7	5 6	23	25	16 53	5 12		
26	18	7	4 43	10	26	17 52	4 49		
27	19	7	4 19	23	27	18 52	4 25		
28	20	7	3 56	10	28	19 52	4 2		
29	21	7	3 31	23	29	20 52	3 38		
30	22	7	3 7	10	30	21 52	3 15		
31	23	7	2 42	23	31	22 52	2 52		

South Declination.

☉ G. Bears side 58.12 N.

☉ G. Bears back 63.35 N.

MARCH.

☉ Lions back 22.22 N.

March hath xxxi days.

March hath xxxi days.												
The Time of the New Moon.	The Time of the Full Moon.	Month. day.	Week. day.	The English Kalendar.		First year, ○ in Pisces.		Diff. of Decl.	Second year, ○ in Pisces.			
				Suns rising.	Suns setting.	Suns Longi.	Suns Decl.		Suns Longi.	Suns Decl.		
											H.M.	H.M.
8 052		1	A	David	5 42	1 21 35	3 21	24	1 21 21	3 27		
16 13 34		2	B	5 16	5 44	2 22 35	2 57		2 22 30	3 3		
		3	C	5 14	5 46	3 23 34	2 34	24	3 23 20	2 40		
5 215		4	D	6 12	5 48	4 4 34	2 10		4 24 19	2 16		
13 22 24		5	E	6 10	5 50	5 25 33	1 46	24	5 25 19	1 53		
		6	F	5 8	5 52	6 6 33	1 23		6 26 18	1 29		
2 11 5		7	G	6 6	5 54	7 27 31	0 59	24	7 27 18	1 5		
		8	A	5 4	5 56	8 28 32	0 35		8 28 18	6 41		
10 7 14		9	B	5 2	5 58	9 9 31	0 12	24	9 29 17	* 18		
		10	C	Sun in Aries		10 V 31	* 12		10 V 16	0 6		
18 3 23		11	D	Gregory	2 11	1 30	0 36	24	11 1 16	0 30		
7 16 4		12	E	5 56	5 41	2 30	1 0		12 2 15	0 54		
		13	F	5 54	5 43	3 25	1 23	24	13 3 14	1 18		
25 4 45		14	G	5 52	5 41	4 28	1 47		14 4 24	1 41		
4 17 26		15	A	5 50	5 40	5 27	2 10	24	15 5 13	2 5		
11 13 35		16	B	5 48	5 38	6 20	2 34		16 6 12	2 29		
		17	C	5 46	5 34	7 25	2 57	24	17 7 11	2 53		
21 2 16		18	D	Edward	16 18	8 24	3 21		18 8 10	3 16		
9 22 25		19	E	5 42	5 38	9 24	3 44	23	19 9 5	3 39		
		20	F	Benedict	20 26	10 21	4 7		20 10 5	8 2		
17 11 6		21	G	5 38	5 32	11 21	4 30	23	21 11 7	4 25		
		22	A	5 36	5 24	12 20	4 54		22 12 6	4 48		
6 7 15		23	B	5 34	5 26	13 19	5 17	23	23 13 3	5 11		
14 19 56		24	C	5 32	5 28	14 18	5 40		24 14 4	5 34		
		25	D	Annun.	25 25	15 17	6 3	23	25 15 3	5 57		
3 8 18		26	E	5 28	5 31	16 16	6 25		26 16 2	6 16		
		27	F	5 26	5 34	17 15	6 48	23	27 17 1	6 43		
11 4 46		28	G	5 24	5 36	18 14	7 11		28 18 0	7 5		
19 17 28		29	A	5 22	5 38	19 13	7 33	22	29 18 58	7 27		
8 13 37		30	B	5 20	5 40	20 11	7 55		30 19 57	7 49		
		31	C	5 18	5 42	21 10	8 17		31 20 55	8 11		

March.

Third year, ☉ in Pisces			D. of Decl.	Leap-year, ☉ in Pisces.			D. of Decl.	The Forreign Account. And The Southing of the Stars just at midnight.	
1659.	Suns Long	Suns Decl.		1660.	Suns Long	Suns Decl.			
	D. M.	D. M.			D. M.	D. M.			
1	21 6	3 33	24	1	21 51	3 15	11	♈	
2	22 6	3 9		2	22 51	2 51	12	♉	Lions tail 16. 28. N.
3	23 5	2 45	24	3	23 51	2 27	13	♊	Great Beares thigh. 55.
4	24 5	2 21		4	24 50	2 4	14	♋	(36. N.
5	25 5	1 58	24	5	25 50	1 40	15	♌	
6	26 4	1 34		6	26 49	1 16	16	♍	
7	27 4	1 10	24	7	27 49	0 52	17	♎	
8	28 3	0 47		8	28 48	0 29	18	♏	
9	29 3	0 23	24	9	29 48	0 05	19	♐	
10	✓ 2	* 01		10	✓ 47	* 19	20	♑	
11	1 1	0 24	4	11	1 47	0 43	21	♒	
12	2 1	0 48		12	2 46	1 06	22	♓	
13	3 0	1 12	24	13	3 45	1 30	23	♈	
14	3 59	1 35		14	4 44	1 53	24	♉	
15	4 59	1 59	24	15	5 44	2 17	25	♊	
16	5 58	2 23		16	6 43	2 41	26	♋	
17	6 57	2 46	24	17	7 42	3 04	27	♌	
18	7 56	3 10		18	8 41	3 27	28	♍	
19	8 55	3 33	23	19	9 40	3 51	29	♎	
20	9 54	3 56		20	10 39	4 14	30	♏	
21	10 53	4 19	23	21	11 38	4 37	31	♐	
22	11 52	4 43		22	12 37	5 00		♑	
23	12 51	5 06	23	23	13 36	5 23		♒	
24	13 50	5 29		24	14 35	5 46		♓	
25	14 49	5 52	23	25	15 34	6 09		♈	
26	15 48	6 14		26	16 32	6 31		♉	
27	16 47	6 37	23	27	17 31	6 54		♊	
28	17 45	7 00		28	18 30	7 17		♋	
29	18 44	7 22	23	29	19 29	7 39		♌	
30	19 43	7 44		30	20 27	8 1		♍	
31	20 41	8 06		31	21 26	8 23		♎	

South Declination. North Declination increasing.

Annunciation of Mary

First in Gr. Beares-tail.
57-50.N.

APRIL.

(9. 21. S.
Virgins Spike, Acimon.
Second in Great Beares
(tail 56. 44 N.

April hath xxx dayes.

April hath xxx dayes.													
The Prime.	New Moon.	The time of the Month-day.	The English Kalendar.		First year, ☉ in Aries.				Diff. of Decl.	Second year, ☉ in Aries.			
			Suns rising	Suns setting	Suns Longi	Suns Decl	Suns Longi	Suns Decl					
										H.M.	H.M.	D.M.	D.M.
16	2 18	1	☉	5 16 6 44	1	22 8 8 39	22	1	21 54 8 34				
5	15 0	2	☉	5 14 6 46	2	23 7 9 1	22	2	22 53 8 56				
13	11 8	3	☉	5 12 6 48	3	4 5 9 23	22	3	23 51 9 17				
2	23 49	4	☉	5 8 6 52	4	5 4 9 44	22	4	24 50 9 39				
10	20 00	5	☉	5 6 6 54	5	6 52 10 6 11	22	5	25 48 10 1				
18	16 7	6	☉	5 6 6 54	6	17 6 10 27	22	6	26 47 10 22				
7	4 18	7	☉	5 4 6 56	7	17 59 10 48	22	7	27 45 10 43				
15	17 29	8	☉	5 3 6 57	8	18 58 11 9	22	8	28 43 11 4				
4	6 10	9	☉	Sun in Taur.	9	19 56 11 30	20	9	29 42 11 25				
12	2 19	10	☉	5 0 7 0	10	8 54 11 50	10	10	30 40 11 45				
1	15 0	11	☉	4 58 7 2	11	1 52 12 10	20	11	1 38 12 5				
9	11 9	12	☉	4 56 7 4	12	2 51 12 30	12	12	2 37 12 26				
17	00 00	13	☉	4 54 7 6	13	3 49 12 50	20	13	3 35 12 46				
6	20 00	14	☉	4 52 7 8	14	4 47 13 9	14	14	4 33 13 5				
14	8 40	15	☉	4 50 7 10	15	5 45 13 29	19	15	5 31 13 25				
3	21 2	16	☉	4 49 7 11	16	6 43 13 49	16	16	6 29 13 44				
11	17 31	17	☉	4 47 7 13	17	7 41 14 8	19	17	7 27 14 3				
19	6 12	18	☉	4 45 7 15	18	8 39 14 26	18	18	8 25 14 22				
8	2 22	19	☉	4 43 7 17	19	9 37 14 45	18	19	9 23 14 41				
16	15 2	20	☉	4 41 7 19	20	10 35 15 3	20	20	10 21 14 59				
5	15 0	21	☉	4 40 7 20	21	11 33 15 21	18	21	11 19 15 17				
13	11 8	22	☉	4 38 7 22	22	12 31 15 34	22	22	12 17 15 35				
2	23 49	23	☉	George	23	13 29 15 57	17	23	13 15 15 53				
10	20 00	24	☉	4 35 7 25	24	14 27 16 24	24	24	14 13 16 10				
18	16 7	25	☉	Mark Eva.	25	15 25 16 31	17	25	15 11 16 27				
7	4 18	26	☉	4 32 7 29	26	16 23 16 48	26	26	16 9 16 44				
15	17 29	27	☉	4 29 7 31	27	17 21 17 5	16	27	17 7 17 1				
4	6 10	28	☉	4 28 7 32	28	18 19 17 21	28	28	18 5 17 17				
12	2 19	29	☉	4 26 7 34	29	19 16 17 27	16	29	19 2 17 33				
1	15 0	30	☉	4 25 7 35	30	20 14 17 32	30	30	20 0 17 49				

Third year, ☉ in Aries		☉	Leap year, ☉ in Aries		☉	The Foreign Account. And The Southing of the Stars just at midnight.	
Suns Long	Suns Decl.		Suns Long	Suns Decl.			
D.M.	D.M.		D.M.	D.M.			
1 31 40 08 29	15	1	3 23 24	8 45	1		
2 32 39 08 51		2	2 23 23	9 7	2		
3 23 37 09 12	32	3	3 24 22	9 29	3		
4 24 36 09 34		4	4 25 20	9 50	4		
5 25 34 09 56	21	5	5 26 18	10 11	5	Third in G. Bears tail,	
6 26 33 10 17		6	6 27 17	10 33	6	(51.3. N.	
7 27 31 10 38	11	7	7 28 15	10 54	7		
8 28 29 10 59		8	8 29 14	11 15	8	Centaur's shoulder 35.	
9 29 28 11 20	20	9	9 30 12	11 35	9	(16 S.	
10 30 26 11 40		10	10 31 11	11 55	10		
11 31 24 12 00	20	11	11 32 9	12 16	11		
12 32 23 12 21		12	12 33 7	12 36	12	North Declination.	
13 33 21 12 41	20	13	13 34 5	12 56	13	Asterus 21.1 N.	
14 34 19 13 00		14	14 35 3	13 15	14		
15 35 17 13 20	19	15	15 36 1	13 35	15	North Oblique	
16 36 15 13 39		16	16 37 0	13 54	16		
17 37 13 13 58	19	17	17 38 0	14 15	17		
18 38 11 14 17		18	18 39 0	14 32	18		
19 39 10 14 36	18	19	19 40 0	14 50	19		
20 40 8 14 55		20	20 41 0	15 8	20	South Ballance 14.34 S.	
21 41 6 15 12	18	21	21 42 0	15 26	21	M.A.T.	
22 42 4 15 31		22	22 43 0	15 44	22		
23 43 2 15 49	17	23	23 44 0	16 2	23		
24 44 0 16 06		24	24 45 0	16 19	24		
25 44 37 16 23	17	25	25 46 0	16 36	25		
26 45 35 16 40		26	26 47 0	16 53	26	(38 N.	
27 46 33 16 57	27	27	27 48 0	17 9	27	Fornax Grand 75.	
28 47 31 17 15		28	28 49 0	17 25	28	North Ballance 8.5 S.	
29 48 28 17 32	16	29	29 50 0	17 41	29		
30 49 26 17 49		30	30 51 0	17 57	30		

May hath xxxi. dayes.

The Prime.	New Moon.	The time of the Month-day.	Week-day.	The English Kalender.		First year, ☉ in Taurus		Diff. of Decl.	Second year, ☉ in Taurus	
				Suns rising	Suns setting	1661.	1662.		1663.	1664.
				H.M.	H.M.	D.M.	D.M.		D.M.	D.M.
		1	B		Phel. & Ja.	1 21 12	18 8	15	1 20 58	18 4
5	3 43	2	C	4 21 7	39	2 22 9	18 23		2 21 56	18 19
		3	D		Inven. of C.	3 23 7	18 37	14	3 22 53	18 34
13	0 0	4	E	4 18 7	42	4 24 5	18 51		4 23 51	18 49
2	12 33	5	F	4 16 7	44	5 25 2	19 06	14	5 24 48	19 3
		6	G		Jo. Por. lat.	6 26 0	19 20		6 25 46	19 17
10	8 42	7	A	4 14 7	46	7 26 58	19 33	13	7 26 44	19 30
		8	B	4 13 7	47	8 27 55	19 46		8 27 41	19 43
18	4 51	9	C	4 11 7	49	9 28 53	19 59	13	9 28 39	19 56
7	17 32	10	D		Sun in Gem	10 29 50	20 12		10 29 36	20 9
		11	E	4 8 7	52	11 48 20	20 24	12	11 34 20	21
15	6 13	12	F	4 7 7	53	12 1 45	20 36		12 1 31	20 33
4	18 54	13	G	4 6 7	54	13 2 43	20 47	11	13 2 29	20 44
12	15 3	14	A	4 5 7	55	14 3 40	20 58		14 3 26	20 56
		15	B	4 4 7	56	15 4 37	21 9	10	15 4 24	21 7
1	3 44	16	C	4 3 7	57	16 5 35	21 19		16 5 21	21 17
		17	D	4 2 7	58	17 6 32	21 29	10	17 6 18	21 27
9	0 0	18	E	4 1 7	59	18 7 30	21 39		18 7 16	21 37
17	12 35	19	F		Dunstan.	19 8 27	21 48	9	19 8 13	21 46
		20	G	3 59 8		20 9 24	21 57		20 9 10	21 55
6	8 43	21	A	3 57 8		21 10 22	22 5	8	21 10 8	22 3
14	21 25	22	B	3 56 8		22 11 19	22 13		22 11 5	22 11
		23	C	3 55 8		23 12 16	22 21	7	23 12 2	22 19
3	9 46	24	D	3 55 8		24 13 13	22 28		24 13 0	22 27
		25	E	3 54 8		25 14 11	22 35	7	25 13 57	22 34
11	6 15	26	F		Augustin.	26 15 8	22 42		26 14 54	22 40
19	18 56	27	G	3 52 8		27 16 5	22 48	6	27 15 51	22 46
8	15 5	28	A	3 52 8		28 17 2	22 54		28 16 49	22 52
		29	B	3 51 8		29 18 0	22 59	5	29 17 46	22 58
16	3 46	30	C	3 50 8		30 18 57	23 4		30 18 43	23 3
5	16 27	31	D	3 50 8		31 19 54	23 9		31 19 40	23 8

May.

Third year, ☉ in Taurus				Leap-year, ☉ in Taurus				The Forreign Account. And The Southing of the Stars just at Midnight.	
1659.	Suns Long.	Suns Decli.	Dif. of Decli.	1660.	Suns Long.	Suns Decli.	North Declination decreasing.		
	D. M.	D. M.			D. M.	D. M.			
1	20 44	18 0	15	1	21 28	18 12		11	C
2	21 42	18 15		2	22 25	18 27		12	F
3	22 39	18 30	14	3	23 23	18 42		13	C North Crown 27.53 N.
4	23 37	18 45		4	24 21	18 56		14	A Hinder Guard 73.16 N
5	24 35	18 59	14	5	25 18	19 10		15	B Serpents Neck 7.33 N
6	25 32	19 13		6	26 16	19 23		16	C
7	26 30	19 27	13	7	27 13	19 37		17	D
8	27 27	19 40		8	28 11	19 50		18	E
9	28 25	19 52	13	9	29 9	20 3		19	F
10	29 22	20 6		10	30 6	20 15		20	C
11	30 20	20 18	12	11	1 4	20 27		21	A
12	1 17	20 30		12	2 1	20 39		22	B
13	2 15	20 41	11	13	2 58	20 50		23	C
14	3 12	20 53		14	3 56	21 1		24	D
15	4 14	21 4	10	15	4 53	21 11		25	E Mark Evangelist
16	5 7	21 14		16	5 50	21 22		26	F Scorpions heart 25.36 S
17	6 4	21 24	10	17	6 48	21 32		27	C
18	7 2	21 34		18	7 45	21 41		28	A
19	7 59	21 44	9	19	8 43	21 50		29	B
20	8 57	21 53		20	9 40	21 59		30	C
21	9 54	22 1	8	21	10 37	22 8		31	D
22	10 51	22 9		22	11 35	22 16		1	E IN NE. Phil. James.
23	11 48	22 17	7	23	12 32	22 23		2	F
24	12 46	22 25		24	13 29	22 30		3	C
25	13 43	22 32	7	25	14 27	22 37		4	A Serpentar. knee 15.13 S
26	14 41	22 39		26	15 24	22 44		5	B
27	15 38	22 4	6	27	16 21	22 50		6	C Hercules head 14.50 N.
28	16 35	22 51		28	17 18	22 55		7	D
29	17 32	22 57	5	29	18 15	23 0		8	E
30	18 29	23 2		30	19 13	23 5		9	F
31	19 26	23 7	13	31	20 10	23 10		10	C

June hath xxx. dayes.

The Prime.	The name of the New Moon.	Month-day.	Week-day.	The English Kalender.		First year, ☉ in Gemini		Dist of Decl.	Second year, ☉ in Gemini	
				Suns rising	Suns setting	Suns Long	Suns Decl		Suns Long	Suns Decl
				H.M.	H.M.	D.M.	D.M.		D.M.	D.M.
		1	☉	3 49 8	11	1 20 51	22 13	4	1 20 37	23 12
13	12 36	2	☿	3 49 8	11	2 21 48	23 17		2 21 34	23 16
		3	☽	3 49 8	11	3 22 45	23 20	3	3 22 32	23 19
2	1 17	4	☿	3 48 8	12	4 23 43	23 23		4 23 29	23 22
10	21 26	5	☽	Boniface	12	5 24 40	23 26	2	5 24 16	23 25
		6	☿	3 48 8	12	6 25 37	23 28		6 25 23	23 27
18	17 35	7	☽	3 47 8	13	7 26 34	23 29	1	7 26 20	23 29
		8	☿	3 47 8	13	8 27 31	23 31		8 27 17	23 30
7	6 16	9	☽	3 47 8	13	9 28 28	23 31		9 28 15	23 31
15	18 57	10	☿	3 47 8	13	10 29 25	23 32		10 29 12	23 32
		11	☽	Longest day		11 30 23	23 32	10	11 30 09	23 32
4	7 38	12	☿	Sun in Canc		12 1 20	23 31		12 1 06	23 32
12	3 47	13	☽	Dayes shor		13 2 17	23 31	1	13 2 03	23 31
1	16 29	14	☿	3 47 8	13	14 3 14	23 30		14 3 00	23 30
		15	☽	3 47 8	13	15 4 11	23 28	2	15 3 57	23 28
9	12 37	16	☿	3 48 8	12	16 5 8	23 26		16 4 54	23 27
		17	☽	3 48 8	12	17 6 5	23 24	3	17 5 51	23 25
17	1 19	18	☿	3 48 8	12	18 7 2	23 21		18 6 48	23 22
		19	☽	3 49 8	11	19 7 59	23 17	4	19 7 46	23 18
6	11 27	20	☿	Edwa.	11	20 8 56	23 14		20 8 43	23 15
14	10 9	21	☽	3 49 8	11	21 9 54	23 10	5	21 9 40	23 11
		22	☿	3 50 8	10	22 10 51	23 5		22 10 37	23 6
12	12 30	23	☽	3 50 8	10	23 11 48	23 0	5	23 11 34	23 1
11	19 00	24	☿	John Bap.		24 12 45	22 55		24 12 31	22 56
		25	☽	3 52 8	8	25 13 42	22 49	6	25 13 28	22 50
15	7 40	26	☿	3 52 8	8	26 14 39	22 43		26 14 25	22 44
18	3 49	27	☽	3 53 8	7	27 15 36	22 37	7	27 15 22	22 38
		28	☿	3 54 8	6	28 16 33	22 30		28 16 20	22 31
16	16 30	29	☽	Peter Ap.		29 17 30	22 23	8	29 17 17	22 24
		30	☿	3 56 8	4	30 18 28	22 15		30 18 14	22 17

June.

Third year, ☉ in Gemini			Leap year, ☉ in Gemini			The Foreign Account. And The Southing of the Stars just at Midnight.		
1659.	Suns Long D. M.	Suns Decl. D. M.	Difference of Decl.	1660.	Suns Long D. M.	Suns Decl. D. M.		
1	20 24	23 11	4	1	21 7	23 14	11	A
2	21 21	23 15		2	22 4	23 18	12	B
3	22 18	23 18	3	3	23 1	23 21	13	C
4	23 15	23 21		4	23 58	23 24	14	D
5	24 12	23 24	2	5	24 56	23 28	15	E
6	25 9	23 27		6	25 53	23 30	16	F
7	26 7	23 29	1	7	26 50	23 31	17	G
8	27 4	23 30		8	27 47	23 32	18	H
9	28 1	23 31		9	28 44	23 32	19	I
10	28 58	23 32		10	29 41	23 32	20	K
11	29 55	23 32		11	30 38	23 32	21	L
12	30 52	23 32		12	31 36	23 31	22	M
13	1 49	23 31	1	13	32 33	23 30	23	N
14	2 46	23 30		14	33 30	23 29	24	O
15	3 43	23 28	2	15	34 27	23 27	25	P
16	4 41	23 27		16	35 24	23 25	26	Q
17	5 38	23 25	3	17	36 21	23 23	27	R
18	6 35	23 22		18	37 18	23 20	28	S
19	7 32	23 19	4	19	38 15	23 16	29	T
20	8 29	23 15		20	39 12	23 13	30	U
21	9 26	23 12	5	21	40 9	23 9	1	V
22	10 23	23 7		22	41 7	23 4	2	W
23	11 20	23 3	5	23	42 4	22 59	3	X
24	12 17	22 58		24	43 1	22 53	4	Y
25	13 14	22 52	6	25	43 58	22 48	5	Z
26	14 12	22 46		26	44 55	22 42	6	A
27	15 9	22 40	7	27	45 52	22 35	7	B
28	16 6	22 33		28	46 49	22 28	8	C
29	17 3	22 26	8	29	47 46	22 21	9	D
30	18 0	22 19		30	48 44	22 13	10	E

North Declination increasing. South Declination decreasing.

(30.05.
Sagittarius arrow head
Dragons head 51.36 N.

John Baptiste.

The Harp 38.30 N.

Peter Apostle.

IN L.T.

Swans Bill 27.17 N.

July hath xxxi. dayes.

July hath xxxi. dayes.														
The Prime.	New Moon.	The time of the H.M.	Month-day.	Week-day.	The English Kalender.	First year, ☉ in Cancer				Diff. of Decl.	Second year, ☉ in Cancer			
						Suns	Suns	Suns			Suns	Suns	Suns	
						rising H.M.	setting H.M.	1661.	Long D.M.		Decli D.M.	1662.	Long D.M.	Decli D.M.
			1	☉	Visit. Mar.			1 19 25	22 7	8	1 19 11	22 9		
15	1 20		2	♈	3 57 8 3			2 20 22	21 59		2 20 8	22 1		
	2 14 1		3	♈	Martin 8 2			3 21 19	21 50	9	3 21 5	21 52		
			4	☽	3 59 8 1			4 22 16	21 41		4 22 2	21 43		
10	10 10		5	♉	4 1 7 59			5 23 13	21 32	10	5 23 0	21 34		
			6	☊	4 2 7 58			6 24 11	21 22		6 23 57	21 24		
18	6 19		7	♊	4 3 7 57			7 25 8	21 11	10	7 24 54	21 14		
7	19 0		8	☋	4 4 7 56			8 26 5	21 01		8 25 51	21 4		
			9	♌	4 5 7 55			9 27 2	20 50	11	9 26 48	20 53		
15	7 41		10	♍	4 6 7 54			10 27 59	20 39		10 27 46	20 42		
	4 20 22		11	♎	4 7 7 53			11 28 57	20 27	12	11 28 43	20 30		
12	16 31		12	♏	Sun in Leo			12 29 54	20 15		12 29 40	20 18		
			13	☽	4 10 7 50			13 30 51	0 3	13	13 30 37	20 6		
1	5 12		14	♐	4 11 7 49			14 1 48	19 50		14 1 35	19 53		
			15	☉	Swithin 48			15 2 46	19 37	13	15 2 32	19 40		
9	1 21		16	♑	4 14 7 46			16 3 43	19 24		16 3 30	19 27		
17	14 3		17	♒	4 15 7 45			17 4 40	19 10	14	17 4 27	19 14		
			18	☊	4 17 7 43			18 5 38	18 56		18 5 24	19 0		
6	10 11		19	♓	Dog da. be.			19 6 35	18 42	14	19 6 21	18 45		
14	12 53		20	☾	Margar. 40			20 7 32	18 27		20 7 19	18 31		
			21	♈	4 21 7 39			21 8 30	18 12	15	21 8 16	18 16		
5	11 14		22	☉	Magdal. 37			22 9 27	17 57		22 9 13	18 1		
			23	♉	4 25 7 35			23 10 25	17 42	16	23 10 11	17 46		
11	7 43		24	♊	4 26 7 31			24 11 22	17 26		24 11 8	17 30		
23	20 24		25	♋	James Ap.			25 12 20	17 10	16	25 12 6	17 14		
8	16 33		26	♌	Anna 7 30			26 13 17	16 54		26 13 3	16 58		
			27	☽	4 31 7 29			27 14 15	16 37	17	27 14 1	16 41		
10	5 14		28	♍	4 33 7 27			28 15 12	16 20		28 14 58	16 24		
5	17 55		29	☊	4 35 7 25			29 16 10	16 3	17	29 15 56	16 7		
			30	♎	4 36 7 24			30 17 7	15 46		30 16 53	15 50		
13	14 14		31	♏	4 38 7 22			31 18 5	15 28		31 17 51	15 32		

July.

Third year. ☉ in Cancer			Diff. of Decl.	Leap-year. ☉ in Cancer			The Foreign Account. And The Southing of the Stars just at Midnight.	
Suns Long.	Suns Decl.			Suns Long.	Suns Decl.			
D.M.	D.M.			D.M.	D.M.			
159.				160.				
1 18 57	22 11	8		1 19 41	22 5		11	L
2 19 54	22 3			2 20 38	21 56		12	D
3 20 52	21 54	9		3 21 35	21 48		13	E
4 21 45	21 45			4 22 32	21 38		14	F
5 22 46	21 36	10		5 23 29	21 29		15	G
6 23 43	21 26			6 24 26	21 19		16	A
7 24 40	21 16	10		7 25 24	21 8		17	B
8 25 37	21 06			8 26 21	20 58		18	C
9 26 35	20 55	11		9 27 18	20 47		19	D
10 27 32	20 44			10 28 15	20 35		20	E
11 28 29	20 33	12		11 29 13	20 24		21	F
12 29 26	20 21			12 30 10	20 12		22	G
13 30 24	20 09	13		13 31 7	19 59		23	A
14 31 21	19 56			14 32 4	19 47		24	B
15 32 18	19 43	13		15 33 2	19 33		25	C
16 33 15	19 30			16 34 59	19 20		26	D
17 34 13	19 17	14		17 35 56	19 6		27	E
18 35 10	19 03			18 36 54	18 52		28	F
19 36 7	18 49	14		19 37 51	18 38		29	G
20 37 5	18 34			20 38 48	18 23		30	A
21 38 2	18 20	15		21 39 46	18 8		31	B
22 39 0	18 05			22 40 43	17 53		1	C
23 40 57	17 49	16		23 41 41	17 37		2	D
24 41 54	17 34			24 42 38	17 22		3	E
25 42 52	17 18	16		25 43 36	17 5		4	F
26 43 49	17 02			26 44 33	16 49		5	G
27 44 47	16 45	17		27 45 31	16 32		6	A
28 45 44	16 29			28 46 28	16 16		7	B
29 46 42	16 13	17		29 47 26	15 58		8	C
30 47 39	15 54			30 48 23	15 41		9	D
31 48 37	15 37			31 49 21	15 23		10	E

North Declination decreasing.

2 thigh, and Vultures
(heart. 35.27 S. 8.2 N.

James Apostle.

Swans tail, and Dolphins
head. 44.6 N. 14.57. N.

AUGUST.

August hath xxxi. dayes.

The Prime.	New Moon.	The time of the H.M.	Month-day.	Week-day.	The English Kalender.		First year, ☉ in Leo		Diff. of Decl.	Second year, ☉ in Leo	
					Suns rising	Suns setting	Suns Longi	Suns Decl		Suns Longi	Suns Decl
					H.M.	H.M.	1661. D.M.	D.M.		168. D.M.	D.M.
			1	☉	Lamm.	20	1 19 02	15 10 18		1 18 48	15 11
	2	245	2	☉	4 41	7 19	2 10 00	14 52		2 19 46	14 56
	10	22 54	3	☉	4 43	7 17	3 20 58	14 34	19	3 20 44	14 38
			4	☉	4 44	7 16	4 21 55	14 15		4 21 41	14 19
	18	19 3	5	☉	4 46	7 14	5 22 53	13 56	19	5 22 39	14 1
			6	☉	4 48	7 12	6 23 51	13 37		6 23 37	13 42
	7	7 44	7	☉	4 50	7 10	7 24 48	13 18	19	7 24 36	13 23
	15	20 25	8	☉	4 52	7 8	8 25 46	12 59		8 25 32	13 3
			9	☉	4 53	7 7	9 26 44	12 39	20	9 26 30	12 43
	4	9 6	10	☉	Laurence	5	10 27 42	12 19		10 27 28	12 23
	12	5 15	11	☉	4 57	7 3	11 28 40	11 59	20	11 28 26	12 3
	1	17 57	12	☉	4 59	7 1	12 29 38	11 39		12 29 24	11 43
			13	☉	Sun in Vir		13 30 35	11 19	21	13 30 22	11 23
	9	14 5	14	☉	5 2 6	58	14 31 33	10 58		14 31 19	11 3
			15	☉	5 4 6	56	15 32 31	10 37	21	15 32 17	10 42
	17	247	16	☉	5 6 6	54	16 33 29	10 16		16 33 15	10 21
	6	22 55	17	☉	5 8 6	52	17 34 27	9 55	21	17 34 13	10 0
	14	11 37	18	☉	5 10 6	50	18 35 25	9 34		18 35 11	9 39
			19	☉	5 12 6	48	19 36 23	9 12	22	19 36 9	9 17
			20	☉	5 14 6	46	20 37 21	8 51		20 37 8	8 56
	3	0 0	21	☉	5 16 6	44	21 38 20	8 29	22	21 38 6	8 34
	11	20 27	22	☉	5 18 6	42	22 39 18	8 7		22 39 4	8 12
			23	☉	5 20 6	40	23 40 16	7 45	22	23 40 2	7 50
	19	9 8	24	☉	Bartholm.	14	24 41 14	7 23		24 41 0	7 28
	8	5 17	25	☉	5 24 6	36	25 42 12	7 1	23	25 42 58	7 6
	16	17 58	26	☉	5 26 6	34	26 43 11	6 38		26 43 57	6 41
			27	☉	5 28 6	32	27 44 9	6 16	23	27 44 53	6 21
	5	6 39	28	☉	Dag d. end		28 45 7	5 53		28 45 53	5 58
			29	☉	John bebe.		29 46 6	5 30	23	29 46 52	5 35
	13	248	30	☉	5 33 6	27	30 47 4	5 8		30 47 50	5 13
	2	15 20	31	☉	5 35 6	25	31 48 3	4 45		31 47 49	4 50

August.

Third year,
☉ in Leo

Leap-year.
☉ in Leo

The
Forreign Account.
And

The Southing of the Stars
just at Midnight.

1659.	Suns		Diff. of Decl.	1669.	Suns	
	Longi	Decl.			Long.	Decl.
	D.M.	D.M.			D.M.	D.M.
1	18 35	15 16	18	1	19 18	15 6
2	19 32	15 1		2	20 16	14 47
3	20 30	14 43	19	3	21 14	14 29
4	21 27	14 24		4	22 11	14 10
5	22 25	14 6	19	5	23 9	13 51
6	23 23	13 47		6	24 7	13 32
7	24 21	13 27	19	7	25 4	13 12
8	25 18	13 7		8	26 2	12 53
9	26 16	12 48	20	9	27 0	12 32
10	27 14	12 29		10	27 58	12 14
11	28 12	12 9	20	11	28 56	11 53
12	29 10	11 49		12	29 54	11 33
13	30 8	11 28	21	13	30 52	11 12
14	1 5	11 8		14	1 50	10 52
15	2 3	10 47	21	15	2 47	10 31
16	3 1	10 26		16	3 45	10 10
17	3 59	10 5	21	17	4 43	9 49
18	4 57	9 44		18	5 41	9 28
19	5 55	9 23	22	19	6 40	9 6
20	6 53	9 1		20	7 38	8 4
21	7 52	8 39	22	21	8 36	8 3
22	8 50	8 17		22	9 34	8 1
23	9 48	7 55	22	23	10 32	7 39
24	10 46	7 33		24	11 30	7 17
25	11 44	7 11	23	25	12 29	6 54
26	12 43	6 49		26	13 27	6 32
27	13 41	6 26	23	27	14 25	6 9
28	14 39	6 4		28	15 24	5 47
29	15 38	5 41	23	29	16 22	5 24
30	16 36	5 18		30	17 20	5 1
31	17 35	4 55		31	18 10	4 38

North Declination decreasing.

Pegasus month, and Capricornus tail.

Bartholomew Apostle.

Fornabent.

SEPTEMBER.

Pegasus shoulder 26.15.

(N. and wing 13.24. N.

August hath xxxi. days.

August harch xxxi. dayes.																		
The Prime.	The time of the New Moon.	Month-day.	Week-day.	The English Kalender.		First year, ☉ in Leo		Diff. of Decl.	Second year, ☉ in Leo									
				Suns rising	Suns setting	Suns Longi	Suns Decl		Suns Longi	Suns Decl								
				H.M.	H.M.	D.M.	D.M.		D.M.	D.M.								
		1	☾	Lamm.	20	1	19	02	15	10	18	1	18	48	15	11		
2	2 45	2	☿	4	41	7	19	2	10	00	14	32	2	19	46	14	56	
10	22 54	3	☿	4	43	7	17	3	20	58	14	34	19	3	20	44	14	38
		4	☿	4	44	7	16	4	21	55	14	15		4	21	41	14	15
18	19 3	5	☿	4	46	7	14	5	12	53	13	56	19	5	12	39	14	1
		6	☿	4	48	7	12	6	23	51	13	37		6	23	37	13	42
7	7 44	7	☿	4	50	7	10	7	24	48	13	18	19	7	24	36	13	23
15	20 25	8	☿	4	52	7	8	8	25	46	12	59		8	25	32	13	3
		9	☿	4	53	7	7	9	26	44	12	39	20	9	26	30	12	43
4	9 6	10	☿	Laurence	5	10	27	41	12	19			10	27	28	12	23	
12	5 15	11	☿	4	57	7	3	11	28	40	11	59	20	11	28	26	12	3
1	17 57	12	☿	4	59	7	1	12	29	38	11	39		12	29	24	11	43
		13	☿	Sun in Vir		13	30	35	11	19	21	13	30	13	30	22	11	23
9	14 5	14	☿	5	2	6	58	14	1	33	10	58		14	1	19	11	3
		15	☿	5	4	6	56	15	2	31	10	37	21	15	2	17	10	42
17	247	16	☿	5	6	6	54	16	3	29	10	16		16	3	15	10	31
6	22 55	17	☿	5	8	6	52	17	4	27	9	55	21	17	4	13	10	0
14	11 37	18	☿	5	10	6	50	18	5	25	9	34		18	5	11	9	39
		19	☿	5	12	6	48	19	6	23	9	12	22	19	6	9	9	17
		20	☿	5	14	6	46	20	7	21	8	51		20	7	8	8	56
3	0 0	21	☿	5	16	6	44	21	8	20	8	29	22	21	8	6	8	34
11	20 27	22	☿	5	18	6	42	22	9	18	8	7		22	9	4	8	12
		23	☿	5	20	6	40	23	10	16	7	45	22	23	10	2	7	50
19	9 8	24	☿	Bartholm.	24	11	14	7	23				24	11	0	7	28	
8	5 17	25	☿	5	24	6	36	25	12	12	7	13	23	25	11	58	7	6
16	17 58	26	☿	5	26	6	34	26	13	11	6	38		26	12	57	6	43
		27	☿	5	28	6	32	27	14	9	6	16	23	27	13	55	6	21
5	6 39	28	☿	Tag v. end		28	15	7	5	53			28	14	53	5	58	
		29	☿	John bebe.		29	16	6	5	30			29	15	52	5	35	
13	248	30	☿	5	33	6	27	30	17	4	5	8		30	16	50	5	13
2	15 20	31	☿	5	35	6	25	31	18	3	4	45		31	17	49	4	50

August.

Third year,
☉ in Leo

☉ of Decl.

Leap-year.
☉ in Leo

1659.	Suns		1669.	Suns	
	Longi	Decl.		Longi	Decl.
	D.M.	D.M.		D.M.	D.M.
1	18 35	15 16 18	1	19 18	15 6
2	19 32	15 1	2	10 16	14 47
3	20 30	14 43 19	3	21 14	14 29
4	21 27	14 24	4	22 11	14 10
5	22 25	14 6 19	5	23 9	13 51
6	23 23	13 47	6	24 7	13 32
7	24 21	13 27 19	7	25 4	13 12
8	25 18	13 7	8	26 2	12 53
9	26 16	12 48 20	9	27 0	12 32
10	27 14	12 29	10	27 58	12 14
11	28 12	12 9 20	11	28 56	11 53
12	29 10	11 49	12	29 54	11 33
13	30 8	11 28 21	13	30 52	11 12
14	1 5	11 8	14	1 50	10 52
15	2 3	10 47 21	15	2 47	10 31
16	3 1	10 26	16	3 45	10 10
17	3 59	10 5 21	17	4 43	9 49
18	4 57	9 44	18	5 41	9 28
19	5 55	9 23 22	19	6 40	9 6
20	6 53	9 1	20	7 38	8 4
21	7 52	8 39 22	21	8 36	8 3
22	8 50	8 17	22	9 34	8 1
23	9 48	7 55 22	23	10 32	7 39
24	10 46	7 33	24	11 30	7 17
25	11 44	7 11 23	25	12 29	6 54
26	12 43	6 49	26	13 27	6 32
27	13 41	6 26 23	27	14 25	6 9
28	14 39	6 4	28	15 24	5 47
29	15 38	5 41 23	29	16 22	5 24
30	16 36	5 18	30	17 20	5 1
31	17 35	4 55	31	18 10	4 38

North Declination decreasing.

The
Foreign Account.
And

The Southing of the Stars
just at Midnight.

11	♏	
12	♏	Pegasus month, and Ca-
13	♏	pricornus tail.
14	♏	
15	♏	
16	♏	
17	♏	
18	♏	
19	♏	
20	♏	
21	♏	
22	♏	
23	♏	
24	♏	Bartholomew Apostle.
25	♏	
26	♏	
27	♏	
28	♏	
29	♏	
30	♏	
31	♏	Fornabent.
1	♏	SEPTEMBER.
2	♏	Pegasus shoulder 26.15.
3	♏	(N. and wing 13.24. N.
4	♏	
5	♏	
6	♏	
7	♏	
8	♏	
9	♏	
10	♏	

September hath xxx. dayes.

The Prime.	The time of the New Moon.	Month-day.	Week-day.	The English Kalender.		First year, ☉ in Virgo		Diff. of Decl.	Second year, ☉ in Virgo	
				Suns rising	Suns setting	Suns Longi	Suns Decl.		Suns Longi	Suns Decl.
				H.M.	H.M.	1661. D.M.	D.M.		1658. D.M.	D.M.
		1	♂	Giles.	6 23	1 19 01	4 22	24	1 18 47	4 27
10	11 38	2	♂	5 39	6 21	2 20 00	3 58		2 19 46	4 3
		3	♂	5 41	6 19	3 20 58	3 36	24	3 20 44	3 41
18	7 47	4	♂	5 43	6 17	4 21 57	3 22		4 21 43	3 17
	7 20 28	5	♂	5 45	6 15	5 22 55	2 49	24	5 22 41	2 55
		6	♂	5 47	6 13	6 23 54	1 26		6 23 40	2 33
15	9 9	7	♂	Nat. Elizab.		7 24 53	1 22	24	7 24 39	2 38
	4 21 50	8	♂	Nativ. Mar.		8 25 52	0 39		8 25 37	1 45
12	18 0	9	♂	5 53	6 7	9 26 50	1 16	24	9 26 36	1 22
		10	♂	5 55	6 5	10 27 49	52		10 27 35	58
1	6 41	11	♂	5 57	6 3	11 28 48	29	24	11 28 34	33
		12	♂	5 59	6 1	12 29 47	5		12 29 33	11
9	2 50	13	♂	Sun in Libra		13 30 46	18	24	13 30 31	13
	15 35	14	♂	Holy Crosse		14 1 45	42		14 1 30	36
		15	♂	5 5 5 55		15 2 44	5	24	15 2 29	0
6	11 40	16	♂	6 7 5 53		16 3 43	29		16 3 28	23
		17	♂	Lambert	5	17 4 42	52	24	17 4 27	47
4	0 21	18	♂	5 10 5 50		18 5 41	2 16		18 5 26	10
	3 12 42	19	♂	5 12 5 48		19 6 40	39	24	19 6 25	34
		20	♂	5 14 5 46		20 7 38	3		20 7 25	57
11	9 11	21	♂	Patth. Ap.		21 8 38	26	23	21 8 24	3
	19 21 52	22	♂	5 18 5 42		22 9 37	49		22 9 23	34
8	18 1	23	♂	5 20 5 40		23 10 37	4	23	23 10 22	8
	16 16 42	24	♂	5 22 5 38		24 11 36	4		24 11 22	31
		25	♂	Cyprian.	36	25 12 35	59	23	25 12 21	54
5	19 23	26	♂	6 26 5 34		26 13 35	5		26 13 20	17
		27	♂	5 28 5 32		27 14 34	5	23	27 14 20	40
13	15 32	28	♂	5 30 5 30		28 15 33	9		28 15 19	4
		29	♂	Michael A.		29 16 33	6	23	29 16 19	27
2	4 13	30	♂	Hieroms	26	30 17 32	6		30 17 18	49

September.

Third year, ☉ in Virgo.		Diff. of Decl.	Leap year, ☉ in Virgo.		The Foreign Account. And The Southing of the Stars just at Midnight.
Suns Long.	Suns Decl.		Suns Long.	Suns Decl.	
D. M.	D. M.		D. M.	D. M.	
1659.			1660.		
1 18 33	04 33	23	1 19 17	04 15	11 B
2 19 31	04 10		2 20 16	03 52	12 C
3 20 30	03 47	24	3 21 14	03 29	13 D
4 21 29	03 23		4 22 13	03 6	14 E
5 22 27	03 0	24	5 23 12	02 42	15 F
6 23 26	02 37		6 24 10	02 19	16 G
7 24 24	02 14	24	7 25 9	01 56	17 A
8 25 23	01 50		8 26 8	01 32	18 B
9 26 22	01 27	24	9 27 6	01 9	19 C
10 27 21	01 3		10 28 5	00 46	20 D
11 28 19	00 40	24	11 29 4	00 22	21 E
12 29 18	00 17		12 30 1	00 1	22 F
13 30 17	00 0	24	13 31 0	00 25	23 G
14 1 16	00 30		14 2 1	00 48	24 A
15 2 15	00 54	24	15 3 0	01 12	25 B
16 3 14	01 17		16 3 59	01 36	26 C
17 4 13	01 41	24	17 4 58	01 59	27 D
18 5 12	02 4		18 5 57	02 22	28 E
19 6 11	02 28	24	19 6 56	02 46	29 F
20 7 10	02 51		20 7 55	03 9	30 G
21 8 9	03 15	23	21 8 54	03 32	1 A
22 9 8	03 38		22 9 53	03 56	2 B
23 10 7	04 2	23	23 10 52	04 19	3 C
24 11 6	04 25		24 11 51	04 42	4 D
25 12 5	04 48	23	25 12 50	05 6	5 E
26 13 4	05 11		26 13 49	05 29	6 F
27 14 3	05 34	23	27 14 48	05 52	7 G
28 15 2	05 58		28 15 47	06 15	8 A
29 16 1	06 21	23	29 16 46	06 38	9 B
30 17 0	06 44		30 17 45	07 1	10 C

North Declination decreasing. South Declination increasing.

(27.14 N. 57.18 N.
Head *Androm. Caf.* Chair
patth. *A. Pegasus* Wing
(tip 13.18 N.
North in *Wales* tail 10.
(41 South.

Michael Archangel.
South in *Whale* tail.
OCTOBER. (19.51 S.
Pole-Star 87.30 N.

South in *Andromeda's*
(Girdle, 33.52 N.
Cassiopeia's knee 58.27
(N.

October hath xxxi. dayes.

The Prime.	New Moon.	The time of the Month-day.	Week-day.	The English Kalender.		First year, ☉ in Libra.		Diff. of Decl.	Second year, ☉ in Libra.	
				Suns rising	Suns setting	1661. Suns Long	Suns Decl.		1662. Suns Long	Suns Decl.
				H.M.	H.M.	D.M.	D.M.		D.M.	D.M.
		1	A	6 36	5 24	1 18 32	7 17	23	1 18 18	7 11
10	0 22	2	B	6 38	5 22	2 19 32	7 40		2 19 17	7 34
18	20 31	3	C	6 40	5 20	3 20 31	8 3	22	3 20 17	7 57
		4	D	6 42	5 18	4 21 31	8 25		4 21 18	8 19
7	9 12	5	E	6 44	5 16	5 22 31	8 48	22	5 22 16	8 43
15	21 53	6	F	Faith	5 14	6 23 30	9 10		6 23 16	9 5
		7	G	6 48	5 12	7 24 30	9 32	21	7 24 16	9 26
4	10 34	8	A	6 50	5 10	8 25 30	9 54		8 25 15	9 48
12	6 44	9	B	Deniz	5 8	9 26 30	10 16	22	9 26 15	10 10
1	19 25	10	C	6 54	5 6	10 27 30	10 37	10	10 27 15	10 33
		11	D	6 56	5 4	11 28 29	10 59	21	11 28 15	10 53
9	15 34	12	E	6 58	5 2	12 29 29	11 20	12	12 29 15	11 15
		13	F	Sun in Scorp		13 m. 29	11 41	21	13 m. 15	11 36
17	4 15	14	G	7 2 4 58	14	1 29	12 3	14	1 15 11	11 57
		15	A	7 3 4 57	15	2 29	12 23	21	2 15 11	12 18
6	0 24	16	B	7 5 4 55	16	3 30	12 44	16	3 15 11	12 39
14	13 5	17	C	7 7 4 53	17	4 30	13 4	20	4 15 11	12 59
		18	D	Luke Ebr.	18	5 30	13 24	13	5 15 11	13 19
3	1 26	19	E	7 11 4 49	19	6 30	13 44	20	6 15 11	13 39
11	21 55	20	F	7 13 4 47	20	7 30	14 4	20	7 16 11	13 59
		21	G	7 14 4 46	21	8 30	14 24	19	8 16 11	14 19
15	10 36	22	A	7 16 4 44	22	9 31	14 43	22	9 16 11	14 38
8	6 45	23	B	7 18 4 42	23	10 31	15 2	23	10 16 11	14 58
16	19 26	24	C	7 20 4 40	24	11 31	15 23	24	11 17 11	15 17
		25	D	Crispine	38	12 32	15 40	18	12 17 11	15 35
5	8 7	26	E	7 23 4 37	26	13 32	15 58	16	13 18 11	15 54
		27	F	7 25 4 35	27	14 32	16 16	18	14 18 11	16 12
13	4 16	28	G	Sim. & Iud	28	15 33	16 34	17	15 19 11	16 29
2	16 57	29	A	7 29 4 31	29	16 34	16 51	17	16 19 11	16 47
		30	B	7 30 4 30	30	17 34	17 8	8	17 19 11	17 4
10	13 6	31	C	7 32 4 28	31	18 35	17 25	25	18 20 11	17 21

October.

Third year, ☉ in Libra.		Diff of Decl.	Leap-year, ☉ in Libra.		1660.	The Forreign Account. And The Southing of the Stars just at Midnight.	
Suns Long.	Suns Decl.		Suns Long.	Suns Decl.			
D. M.	D. M.		D. M.	D. M.			
1 18	3 07 6	13	1 18 48	07 23	1	D	
2 19	3 07 29		2 19 48	07 46	2	E	
3 20	2 07 52	23	3 20 48	08 9	3	F	
4 21	2 08 14		4 21 47	08 31	4	G	
5 22	2 08 37	23	5 22 47	08 14	5	A	
6 23	2 08 59		6 23 47	09 16	6	B	
7 24	1 09 21	22	7 24 47	09 38	7	C	
8 25	1 09 43		8 25 46	10 0	8	D	Luke Evangelist
9 26	1 10 5	22	9 26 46	10 23	9	E	N. & S. in the Rams horn
10 27	1 10 27		10 27 46	10 43	10	F	(19.9 N. 17.38 N.
11 28	1 10 48	21	11 28 46	11 5	11	G	
12 29	0 11 10		12 29 46	11 26	12	A	Rams head 21.51 N.
13 m	0 11 31	21	13 m 46	11 47	13	B	
14 1	0 11 52		14 1 46	12 8	14	C	
15 2	0 12 13	21	15 2 46	12 29	15	D	
16 3	0 12 34		16 3 46	12 49	16	E	
17 4	1 12 54	20	17 4 46	13 9	17	F	
18 5	1 13 14		18 5 46	13 30	18	G	Simon and Jude.
19 6	1 13 34	20	19 6 47	13 50	19	A	
20 7	1 13 54		20 7 47	14 10	20	B	
21 8	1 14 14	19	21 8 47	14 39	21	C	
22 9	1 14 33		22 9 47	14 48	22	D	NOVEMBER.
23 10	2 14 53	19	23 10 48	15 7	23	E	
24 11	2 15 12		24 11 48	15 26	24	F	
25 12	2 15 30	18	25 12 48	15 44	25	G	
26 13	3 15 49		26 13 49	16 3	26	A	
27 14	3 16 7	18	27 14 49	16 21	27	B	Whales jaw, and Me-
28 15	4 16 24		28 15 50	16 38	28	C	dufa's head. 2.44 N.
29 16	4 16 43	17	29 16 50	16 56	29	D	(39.37 N.
30 17	5 17 0		30 17 51	17 13	30	E	Perseus side. 48.35 N.
31 18	5 17 17		31 18 51	17 30	31	F	

South Declination increasing.

November hath xxx. dayes.

The Prime.	New Moon.	The time of the H.M.	Month-day.	Week-day.	The English Kalender.		First year, ☉ in Scorpio		Diff. of Decl.	Second year, ☉ in Scorpio	
					Suns rising	Suns setting	Suns Long	Suns Decl		Suns Long	Suns Decl
					H.M. H.M.	H.M.	D.M. D.M.	D.M.		D.M. D.M.	D.M.
			1	D	All Saints		19 35	17 42	16	19 21	17 38
18	9 15		2	E	7 36 4 24		20 36	17 58		20 21	17 54
7	21 56		3	F	7 37 4 23		3 21 37	18 14	6	21 23	18 10
			4	S	7 39 4 21		4 22 37	18 30		22 23	18 26
15	10 38		5	M	7 40 4 20		5 23 38	18 45	15	23 23	18 42
4	23 20		6	T	Leonard	17	6 24 39	19 0		24 24	18 57
12	19 28		7	W	7 44 4 16		7 25 40	19 15	14	25 25	19 11
			8	T	7 45 4 15		8 26 40	19 29		26 26	19 25
1	8 9		9	W	7 47 4 13		9 27 41	19 43	14	27 26	19 39
			10	T	7 48 4 12		10 28 42	19 57		28 27	19 53
9	4 18		11	F	Martin	11	11 29 43	20 10	13	29 28	20 7
17	17 0		12	S	Sun in Sagit.	12	2 44 20	20 23		2 29	20 20
			13	T	7 52 4 8		13 1 45	20 35	13	1 30	20 32
6	13 8		14	W	7 53 4 7		14 2 46	20 48		2 31	20 44
			15	T	7 55 4 5		15 3 46	20 59	12	3 32	20 56
14	1 49		16	W	7 56 4 4		16 4 47	21 10		4 33	21 8
3	14 10		17	T	Q. Elizab.	17	5 48	21 21	11	5 34	21 19
			18	F	7 58 4 2		18 6 49	21 32		6 35	21 30
11	10 39		19	S	7 59 4 1		19 7 50	21 42	10	7 36	21 40
19	13 20		20	T	Edmund	0	8 51	21 52		8 37	21 50
8	19 29		21	F	8 1 3 59		21 9 53	22 1	9	9 38	21 59
			22	S	Cicily	3	10 54	22 10		10 39	22 8
16	8 10		23	T	Clement	5	11 55	22 18	8	11 40	22 16
5	20 51		24	F	8 4 3 56		12 56	22 26		12 41	22 24
			25	S	Catherin	5	13 57	22 34	7	13 42	22 32
13	17 0		26	T	8 6 3 54		14 58	22 41		14 43	22 39
			27	W	8 7 3 53		15 59	22 47	6	15 45	22 46
2	5 41		28	T	8 8 3 52		17 1	22 54		16 46	22 54
			29	W	8 9 3 51		18 2	22 59	5	17 47	22 58
10	1 50		30	T	Amos	1	19 3	23 5		18 48	23 5

November.

Third year. ☉ in Scorpio			Leap-year. ☉ in Scorpio			The Forreign Account. And The Southing of the Stars just at Midnight.		
1659.	Suns Longi D.M.	Suns Decl. D. M.	Diff. of Decl.	1660.	Suns Long. D. M.	Suns Decl. D. M.		
1	19 6	17 34	16	1	19 52	17 46	11	☉
2	20 7	17 50		2	20 53	18 3	12	☽
3	21 7	18 6	16	3	21 53	18 18	13	☿
4	22 8	18 22		4	22 54	18 34	14	♄
5	23 9	18 38	15	5	23 55	18 49	15	♅
6	24 5	18 53		6	24 55	19 4	16	☌
7	25 16	19 8	14	7	25 56	19 19	17	♄
8	26 11	19 23		8	26 57	19 33	18	☌
9	27 11	19 36	14	9	27 58	19 47	19	☿
10	28 12	19 50		10	28 59	20 0	20	☽
11	29 13	0 4	13	11	29 59	20 13	21	☌
12	2 14	20 16		12	2 0	20 26	22	☌
13	1 15	20 29	12	13	2 1	20 39	23	☌
14	2 16	20 42		14	3 2	20 51	24	☌
15	3 17	20 53	11	15	4 3	21 2	25	☌
16	4 18	21 5		16	5 4	21 13	26	☌
17	5 19	21 16	11	17	6 5	21 24	27	☌
18	6 20	21 27		18	7 6	21 35	28	☌
19	7 21	21 37	10	19	8 7	21 45	29	☌
20	8 22	21 47		20	9 8	21 54	30	☌
21	9 23	21 57	9	21	10 9	22 3	1	☌
22	10 24	22 6		22	11 10	22 12	2	☌
23	11 25	22 14	8	23	12 12	22 20	3	☌
24	12 26	22 22		24	13 13	22 28	4	☌
25	13 27	22 30	7	25	14 14	22 36	5	☌
26	14 29	22 37		26	15 15	22 43	6	☌
27	15 30	22 44	6	27	16 16	22 49	7	☌
28	16 31	22 51		28	17 17	22 55	8	☌
29	17 32	22 57	5	29	18 18	23 1	9	☌
30	18 33	23 2		30	19 20	23 6	10	☌

South Declination increasing.

Perseus foot 30.52 N.

Bulls eye 15.47 N.

Antares Apollis.

DECEMBER.

The Goat 45.36 N.

Oriens foot 8.37 S.

Oriens first shoulder 06.

(00 North.

December hath xxxi. dayes.

The Prime.	New Moon.	The time of the H.M.	Month-day.	Week-day.	The English Kalendar.		1661.	First year, in Sagitariuſ		Diff. of Decl.	Second year, in Sagitariuſ	
					Suns riſing	Suns ſetting		Suns Longi	Suns Decl.		Suns Longi	Suns Decl.
					H.M.	H.M.		D.M.	D.M.		D.M.	D.M.
18	14	31	1	F	8 10	3 50	1	10 4	23 10	4	1 19	49 23
			2	S	8 11	3 49	2	21 5	23 14		2 20	51 23
7	10	40	3	S	8 11	3 49		12 7	23 18	3	3 21	52 23
15	23	22	4	M	8 12	3 48	4	23 8	23 21		4 22	53 23
			5	T	8 12	3 48	5	24 9	23 24	3	5 23	54 23
4	12	2	6	T	8 12	3 48	6	25 11	3 27		6 24	56 23
12	8	12	7	S	8 12	3 48	7	6 12	23 29	2	7 25	57 23
			8	F	Con. Mary.		8	17 13	23 30		8 26	58 23
1	20	53	9	S	8 13	3 47	9	18 14	23 31		9 28	0 23
			10	M	8 13	3 47	10	19 16	23 32		10 29	1 23
9	17	2	11	T	Shorteſt day		11	20 17	23 32		11 30	2 23
			12	S	Sun in Capr		12	1 18	23 33		12 1	3 23
17	5	43	13	T	Lucie		13	2 20	23 31	1	13 2	5 23
			14	F	8 13	3 47	14	3 21	23 29		14 3	6 23
6	150		15	F	8 13	3 47	15	4 22	23 28	2	15 4	7 23
14	14	33	16	S	8 12	3 48	16	5 24	23 26		16 5	9 23
			17	M	8 12	3 48	17	6 25	23 23	3	17 6	10 23
3	2	54	18	T	8 12	3 48	18	7 26	23 19		18 7	11 23
11	23	23	19	S	8 11	3 48	19	8 28	23 16	4	19 8	13 23
			20	M	8 11	3 49	20	9 29	23 11		20 9	14 23
19	12	4	21	T	Thomas		21	10 0	23 7	5	21 10	15 23
8	8	13	22	F	8 10	3 50	22	11 3	23 2		22 11	17 23
16	20	54	23	S	8 9	3 51	23	12 3	22 56	6	23 12	18 22
			24	M	8 8	3 52	24	13 34	22 50		24 13	19 22
5	9	35	25	T	Thomas		25	14 36	22 44	7	25 14	21 22
			26	F	Stephen		26	15 37	22 37		26 15	22 22
13	5	44	27	S	John Chan		27	16 38	22 30	8	27 16	23 22
2	18	25	28	M	Innocent		28	17 39	22 22		28 17	24 22
			29	T	8 4	3 56	29	18 41	22 13	9	29 18	26 22
10	14	34	30	S	8 3	3 57	30	19 42	22 5		30 19	27 22
			31	M	8 2	3 58	31	20 43	21 56		31 20	28 21

December.

1 st year.			Diff. of Decl.	Leap-year.		
☉ in Sagittarius				☉ in Sagittarius		
Suns.	Suns.			Suns.	Suns.	
Long.	Decl.			Long.	Decl.	
D.M.	D.M.			D.M.	D.M.	
1 19 35	23 07	5	1	20 21	23 10	
2 20 36	23 12		2	1 22 23 15		
3 21 37	23 16	4	3	2 24 23 1		
4 22 38	23 20		4	3 25 23 12		
5 23 40	23 23	3	5	4 26 23 25		
6 24 41	23 26		6	5 27 23 27		
7 25 42	23 28		7	6 28 23 29		
8 26 43	23 29		8	7 30 23 30		
9 27 45	23 31		9	8 31 23 31		
10 28 46	23 32		10	9 33 23 32		
11 29 47	23 32		11	10 34 23 32		
12 30 48	23 32		12	1 35 23 31		
13 31 50	23 31	1	13	2 36 23 30		
14 32 51	23 30		14	3 38 23 29		
15 33 53	23 29	2	15	4 39 23 27		
16 34 54	23 27		16	5 40 23 25		
17 35 55	23 24	3	17	6 42 23 21		
18 36 57	23 21		18	7 43 23 18		
19 37 58	23 17	4	19	8 44 23 15		
20 38 59	23 14		20	9 45 23 10		
21 39 1 13	69	5	21	10 47 23 05		
22 40 1 23	04		22	11 48 23 00		
23 41 3 23	59	6	23	12 50 22 54		
24 42 5 22	53		24	13 51 22 48		
25 43 6 22	47	7	25	14 52 22 42		
26 44 7 22	40		26	15 54 22 35		
27 45 8 22	33	8	27	16 55 22 27		
28 46 9 22	25		28	17 56 22 19		
29 47 10 22	17	9	29	18 58 22 11		
30 48 11 22	09		30	19 59 22 02		
31 49 12 22	00		31	20 00 21 53		

Decreasing south Declination, increasing

The Forreign Account. And

The Southing of the Stars
just at Midnight.

1	F	First in Orions Girdle
2		(00.25 South.
3	D	
4	E	(44.52 N.
5	F	The Wagoners shoulder
6	G	Orions right shoulder
7	A	7.18. N.
8	B	
9	C	
10	D	
11	E	Thomas Apostle.
12	F	
13	G	
14	A	Pollux foot 16.39 N.
15	B	Christs Patibly.
16	C	Stephen Martyr.
17	D	John Evangelist.
18	E	Innocents, The great
19	F	(Dog 16.33 South.
20	G	
21	A	
22	B	ANU ART.
23	C	
24	D	
25	E	
26	F	Twelfth day.
27	G	First head of II Castor,
28	A	32.34 N.
29	B	The little dog 6.5 N.
30	C	2d. head of II 28.48 N.
31	D	

A Table of the Suns Declination for every degree of the Ecliptick.

The use of this Table of the Suns Declination.

Degrees.	I		II		Degrees.
	m		s		
	D. M. S.	D. M. S.	D. M. S.	D. M. S.	
0	00 00	11 30 58	10 13 48	30	
1	02 3 57	11 52 2	20 16 23	29	
2	04 7 54	12 12 54	20 38 35	28	
3	1 11 51	12 33 36	20 50 25	27	
4	1 35 46	12 54 6	21 1 26	26	
5	1 59 39	13 14 22	21 12 55	25	
6	2 23 31	13 34 25	21 23 35	24	
7	2 47 21	13 54 14	21 33 50	23	
8	3 11 8	14 13 50	21 43 42	22	
9	3 34 52	14 33 11	21 53 10	21	
10	3 58 33	14 52 18	22 2 13	20	
11	4 22 11	15 11 10	22 10 51	19	
12	4 45 45	15 29 46	22 19 31	18	
13	5 9 13	15 48 6	22 26 51	17	
14	5 32 36	16 6 11	22 34 13	16	
15	5 55 55	16 23 58	22 41 9	15	
16	6 19 8	16 41 30	22 47 49	14	
17	6 42 15	16 58 46	22 53 44	13	
18	7 5 15	17 15 42	22 59 21	12	
19	7 28 5	17 32 18	23 5 32	11	
20	7 50 56	17 48 38	23 9 17	10	
21	8 13 37	18 4 40	23 13 35	9	
22	8 36 9	18 20 21	23 17 27	8	
23	8 58 33	18 35 43	23 20 51	7	
24	9 20 48	18 50 46	23 23 48	6	
25	9 42 54	19 5 28	23 26 18	5	
26	10 4 50	19 19 51	23 28 21	4	
27	10 26 38	19 33 52	23 29 57	3	
28	10 48 16	19 47 32	23 31 5	2	
29	11 9 43	20 0 50	23 31 46	1	
30	11 30 58	20 13 47	23 32 0	0	
	III	IV	V		
	VI	VII	VIII		

The Suns greatest declination, according to the observation of Tycho Brahe, and Mr. Edward Wright, is 23 Deg. 31 Min. 30 Seconds, and so it was in their times, but later observers have found it somewhat more, so that it amounts to in these times 23 deg. 32 m. or very little less; and therefore I have calculated this table to 23 deg. 32 m. for those which shall desire to much exactness.

The use of this Table is thus, if you would know the Declination of the Sun, in any deg. & min. of the Ecliptick, first mark whether the Signe be at head or the foot of the Table; if the Signe be at the top of the table, then count the deg. of the signe downward in the first column of the table, but if the sign be at the foot of the table, then count the deg. upward, as in the last column of the table, and in the common angle, where the character of the signe, and the deg. thereof meets, you shall have the Suns declination in deg. min. and seconds. And here note, if the place of the Sun have both deg. and min. you must see what is the difference of the Declination between the two next deg. and by proportion allow for the odd minutes. Thus

Thus for Example.

The Suns place being 10 deg. of δ 01 m, you see the Character of δ 01 m, are at the top of the Table: therefore find out 10 in the first column, and in the same line under δ ; you will find 14, 42, 18, that is 14 deg. 52 min 18 sec. for the Declination.

But if you would know the Suns declination being in 10 deg. of δ 01 m, then because the Characters are at the bottom of the Table, you must count the deg. upward in the last column, and so against 10 deg. you shall find 17 deg. 48 min. 38 sec. for the Suns declination.

But if the Sun were in 18 deg. 15 min. of δ ; first, you see by the Table, that the 18 deg. of δ , hath 17 deg. 15 min. 42 sec. for its declination; and the 19 deg. hath 17 deg. 32 min. 18 sec. for its declination; the difference between them is 16 min. 36 sec. Then to find out by the Rule of proportion, how much to allow for the 15 min. Say, if 60 min. give 16 min. 36 sec. what shall 15 min. have? and you shall find 4 min. 9 sec. Then consider by the order of the Table, whether this be to be added or subtracted. In this example, it is to be added to the foresaid 17 deg. 15 min. 42 sec. and so the Suns Declination will be 17 deg. 19 min. 51 sec.

And after this manner you may try the Tables of the Suns declination in the Ephemerides, or if need be, you may rectifie them for the time to come. But in ordinary occasions you may leave out the seconds, unless they be more than 30, and then you may add one to the min. for them.

The use and explanation of the former Ephemerides.

These Tables are calculated only for four yeares, and neither more or lesse, because the Leap year is so contrived to regulate the Suns course, that every fifth year the Sun returns to the same place it was before, without any sensible error for many yeares together. So that these Tables may very well serve for 20 yeares to come, only observing the order of the yeares from the Leap year, and taking that Section in the Kalender which belongs unto them.

And that these Tables may last the better, and the longer, I have calculated them now somewhat forwarde then they should

be; they being exactly calculated for the years 1665, 1666, 1667, 1668, by which means they will serve these next 20 yeares, viz. from 1657, to 1677, without any allowance. For there will not be above 4 min. difference in the Suns place more or lesse, any time these 20 yeares; which makes but a minute and half of difference in the Suns declination, (even where the Declination is swiftest) and so can breed no error or danger to the Sea-man in his observations.

But if you will be so exact, that you may the better know what yeares these four Sections of the Ephemerides belong unto, and the minutes which you must adde or subtract to the Longitude of the Sun, to make these Tables more exact herein, observe this Table: But I would wish you not to correct the Declination at all, but rather let it alone as it is, least for want of skill and heed, you make it worse: unless you do it according to Art, by the Table of Declinations at the end of the Ephemerides.

First,	Second,	Third,	Leap-year,	
1657	1658	1659	1660	4 Sub.
1661	1662	1663	1664	2 Sub.
1665	1666	1667	1668	0
1669	1670	1671	1672	2 Adde
1673	1674	1675	1676	4 Adde

To find the Longitude and Declination of the Sun at any time, by these Tables.

First, consider whether it be the first, second, or third year after the Leap-year, (which you may know by the Table at the beginning of the Ephemerides, or in this little Table,) and accordingly look down that Section, which belongs thereunto, and in the Month proposed just against the day of the Month you shall have your desire.

For Example.

If you would know the place and Declination of the Sun the 12 day of April 1667. First, you must note that the year 1667, is one of the third yeares from the Leap-year, and therefore you must look down in that Section for the day of the Month, and
now

now if you turn to the month of April, against the 12 day of that month in the foresaid Section; you shall find, that the Longitude of the Sun is 2 deg. 23 min. of Taurus, and the Declination of the Sun is 12 deg. 21 min. of North Declination. And this is the place and Declination of the Sun not only this day of this year, but also all the other yeares which are joyned with it in the former Table, 1659, 1663, 1671, 1675, without any sensible difference, especially in the Declination, which is the thing most necessary for the Sea-mans use.

And thus with much facility you may know the true Longitude and Declination of the Sun at any time, which is of very great use for the finding of the Latitude of any place, & in working most other conclusions of the Sphere; as you shall see more in its place.

To know the time of the Moons Change, Full, and Quarters.

TO know the day and hour of Conjunction or Change of the Moon, first look into the first page of the Ephemerides, & right against the date of the year, you shall find the Prime or Golden number, which you must remember, and also the Sunday letter for that year, then turn to the month in which you would know the Change of the Moon, and look out the Prime number in the first column, & by it in the second column you shall have the time of the Change in houres and minutes, which houres and minutes you must alwayes reckon afternoon: then in the third column you shall have the day of the month, and by the fourth you may know the day of the week.

For Example.

Anno 1675, I would know the time of the new Moon in June, In the first page of the Kalender, I find that the Prime is 4, and the Sunday letter C, then I turn to the month of June, and I find out the Prime 4, in the first column, and it stands just against the 12 day, which by the Sunday letter you may see is Saturday, now for the time of the Change this day, in the second column you find 7 houres & 8 min. which you must alwayes reckon to be afternoon. And that in your year 1675, it is new Moon the 12 of June being Saturday at 7 of the clock and 8 min. afternoon.

Here you must note, that if the houres and min. of the Change be above 12, then the Change is the next day in the morning according to ordinary account, but this way is altogether used by the Astronomers, who begin the day at noon, and after a little

A Table shewing the Moons motion in Signs, Degr. and Minutes, for ever y day and hour of her Age.

S. D. M.			D. M.		
1	0	13 11	1	0	33
2	0	26 21	2	1	6
3	1	9 32	3	1	39
4	1	22 42	4	2	12
5	2	5 53	5	2	45
6	2	19 3	6	3	18
7	3	2 14	7	3	51
8	3	15 25	8	4	24
9	3	28 35	9	4	56
10	4	11 46	10	5	29
11	4	24 56	11	6	2
12	5	8 7	12	6	35
13	5	21 18	13	7	8
14	6	4 28	14	7	41
15	6	17 39	15	8	14
16	7	00 49	16	8	47
17	7	14 0	17	9	20
18	7	27 11	18	9	53
19	8	10 21	19	10	26
20	8	23 32	20	10	59
21	9	6 42	21	11	32
22	9	19 53	22	12	5
23	10	3 3	23	12	38
24	10	16 14	24	13	11
25	10	29 25			
26	11	12 35			
27	11	25 46			
28	0	8 56			
29	0	22 7			
30					

The hour of the Moons age.

The days of the Moons age.

Now by this Table knowing the age of the Moon since the change, you may see how much must be added to the place of the Moon that she then was in, and if it shall come to more signes then 12, you must cast 12 away, and that which remaines, will shew the Signe, Degree, and Minute the Moon is in.

For Example.

Suppose you would know the Moons place the 19 of June, at Noon, Anno 1675, the Change was the 12 day at 8 houres at night. Therefore the 19 day at noon the Moon is 6 dayes and 16 houres old. Now the place of the Sun and Moon at the Change was as was shewed before,

Sig. Deg. Min.
3 1 0

The Moones }
motion for 6,
dayes is --- }

2 19 3

And for 16 houres

0 8 47

The summe is

5 28 50

That is, in 28 deg. 50 m. of Libra.

Or else you may multiply the Moones age by 2, and divide the Product by 5, and the Quotient will

A Table shewing the time of the Moones comming to the South by her Age.

	H. M.		Min
1	0	49	1
2	1	38	2
3	2	26	3
4	3	15	4
5	4	3	5
6	4	53	6
7	5	41	7
8	6	30	8
9	7	19	9
10	8	8	10
11	8	56	11
12	9	45	12
13	10	34	13
14	11	23	14
15	12	11	15
16	1	0	16
17	1	49	17
18	2	38	18
19	3	26	19
20	4	15	20
21	5	3	21
22	5	53	22
23	6	41	23
24	7	30	24
25	8	19	
26	9	8	
27	9	56	
28	10	45	
29	11	34	
30			

The dayes of the Moons age.

The hours of the Moones age.

till thes you how many Signes, and the Remainer so many times six degrees as the Moon is gone from that Signe and Degree, where the Sun is at that present time.

The use of this Table is thus.

K Nowing, as before, the time of the New Moon, you may easily know her Age any day at Moon in dayes and houres.

Then see what time is allotted for the Dayes, and after for the odder Houres, and adde them together; lastly, see how many minutes is to be allowed for this time, and the summe of all will be the time of the Moons coming to the South.

Example.

Suppose the Moon be any day at Moon 10 dayes, and 8 houres old, the Table will shew first,

For the 10 day 8 hou. 8 min,

For the 8 houres, 0 16

which is 8 24

Now 8 houres 24 min. requires 0 17

All which is the time 8 41 of the Moones coming to the South,

Or else you may do this by the Instrument, page the 8, thus. Turn the moveable Circle so that the age of the Moon may be upon the North or South point of the Compasse, and the Index will shew the time of the Moons coming to the South.

Or else by Arithmetick, multiply the Moons age by 12, and divide the Product by 15, so the Quotient will shew the hour of the Moons coming to the South, and if any thing remain multiply it by 4, and that will shew the minutes to be added to the hours of the Quotient, and so you shall have the time of the Moons coming to the South.

This knowledge of the Moons coming to the South is very necessary for many purposes; for first, hereby you may know the time of high tide at any place, as is shewed before.

Secondly, knowing the time of the Moons coming to the South, you may know the time of the night by the shining of the Moon upon any Sun-dial. Thus :

Observe by a Sun-dial as if you would see what a clock it were by the Moon, and observe how much the shadow of the Moon doth either lack or is past the twelve upon the Dial : so so much it doth want of, or is past the time of the Moons coming to the South.

For Example.

Suppose as before, the Moon did come to the South at 8 hours 41 min. afternoon, and the shadow of the Moon upon the Dial were at 10, this wants 2 hours of 12 : and therefore it wants 2 hours of 8 hours 41 min. so that it is 6 of the clock and 41 min. But if the shadow of the Moon had been at 2 upon the Dial, then you must have added two hours to the Moons coming to the South, and so it had been 10 hours 41 min. at night.

Again, by the time of the Moons coming to the South, and the place of the Moon in the Zodiac, you may know the time of the Moons rising and setting, as thus, knowing what sign and degree the Moon is in, as before, look out when the Sun is in that sign and degree in the Ephemerides, and right against it in the proper column, you shall find the time of the Suns setting, when the Sun is in that sign and degree, this time is half the diurnal arch belonging to that sign and degree of the Ecliptick, which being added to

to the time of the Spoons being South, it will shew the time of the Spoons setting, and if you subtract it from the Spoons being South, it will shew her rising. For Example.

Suppose the Spoon to be in ten degrees of Taurus, and the time of her coming to the South at 10 of the clock at Night. First, I look when the Sun is in ten degrees of Taurus, and that is the 20th. of April, and the time of Sun-set that day is 7 hours 18 min. this added to 10 hours, is time of the Spoons being South, is 17 hours, 18 min. which is 5 of the clock, and 18 min. the next morning, for the time of the Spoons setting; likewise this subtracted from 10 hours, there remains 2 hours 42 min. the time of the Spoons rising. To finde the length of the Day and Night.

In the fifth Column of the Kalender, (among the fixed Feasts) you have the time of the Suns rising and setting, by which you may know the length of the day and night: for the hours and min. of the Suns rising being doubled, gives the length of the Night, and the hours and minutes of the Suns setting being doubled, gives the length of the day.

How to use the Suns Declination, thereby to find out the Elevation of the Pole.

Find out the Altitude or height of the Pole in any several Latitude, viz. How much the Pole is raised above your Horizon in degrees and minutes. It is necessary; first, to take by observation the meridian Altitude of the Sun, which meridian Altitude is known, by taking the height of the Sun that day, in which you would observe, just at noon, at which time the Sun is highest, being then also upon the meridian: which found, note it down in paper or slate: then knowing the year of our Lord, with the moneth in which you are, and also the day of the moneth, look in the Kalender before spoken of, for the moneth and day thereof, and right against the said day of the moneth towards the right hand under the title Suns Decl. you shall see the several years, which the said Table of Declination serves for. If it be the Leap-year, look in the last of y^e said 4 Tables under the title Leap-year: If it be the first after Leap-year, then

then resort to the first of the said Tables under the title First: and so of the second and third; and after those 4 years are past, come back again to the first, and proceed as you did before: then (as I said) having found out the Month, Day, and Year, direct your eye downward toward the foot of that Table, in the Table which serves for the year proposed, till you find a number making a right angle with the day of your month: or more plainly, ask what number in the last Column of your year is right against the day of your month, which numbers are the Declination for the day desired: and there being two numbers in the said Column: the first are degrees, the other minutes: then regard also whether the Sun hath North Declination or South Declination, which is set down between the several spaces: where by the way you shall note, that from the Suns entrance into Aries, which is about the 11 of March, till his entrance into Libra, which is about the 13 of September, he hath North Declination, and from the said 13 of September, till his entrance into Aries again, South Declination: the said declination increasing, according to the Suns progress through the Signes, from his entrance into Aries, till his entrance into Cancer, and decreasing from Cancer, to the beginning of Libra, then again increasing from Libra to Capricorn, and decreasing from Capricorn to the end of Pisces, and beginning of Aries. Aries, Taurus, Gemini, Cancer, Leo, and Virgo, being Signes having North Declination from the Equinoctial Circle: and Libra, Scorpio, Sagittarius, Capricornus, Aquarius, and Pisces, South Signes, having South Declination from that Circle: then knowing (as I have said) the Persian Altitude of the Sun, the Declination of the Sun, and whether the Sun hath South or North Declination: as these three things are alwayes to be considered in knowing the height of the Pole. If the Declination be North, subtract the Declination from the Persian Altitude, the remainder is the Elevation of the Intercession, or cutting of the Equinoctial with the Persian above the Horizon, which in common termes is the Elevation of the Equinoctial above the Horizon: which height of the Equinoctial taken from 90, leaveth the height of the Pole, or the Latitude of the place of your observation. But contrariwise, if the Sun have South Declination, add the said Declination to the Persian Altitude, the Product is the height of the Equinoctial,

al: which likewise taken from 90, leaveth also the height of the Pole. Example.

I observed the 11 of July, 1660, in the City of London, and found the Peridian Altitude of the Sun to be 62 degrees, and the Declination of the Sun North 23 deg. 22 min. Now being that the Declination was North, I subtracted it from the height of the Sun at noon: the remainder was 38 deg. 28 min. the height of the Equinoctial: that taken from 90, leaves 51 deg. 32 min. for the height of the Pole, or Latitude of London.

This Rule is to be understood when you are between the Equinoctial and the North Pole, and the Sun to the Southward of you: But if you should be between the Equinoctial and the South Pole and the Sun North from you, then you must work contrary: for then if the Sun hath South Declination, you must subtract the Declination from the Peridian Altitude; and if the Sunne hath North Declination, you must add the said Declination to the Peridian Altitude. As for Example.

Being at Sea to the Southwards of the Line the 4 of January, 1660, suppose that you observe the height of the Sun at noon, and find it to be 66 deg. 24 min. then you shall find the Declination to be 21 deg. 20 min. to the Southwards, which subtracted from 66 deg. 24 min. the Peridian altitude, leaves 45 deg. 4 min. for the height of the Equinoctial: that taken from 90, rests 44 deg. 56 min. for the height of the South Pole above the Horizon.

Again, suppose that being at Sea the 10 of May 1660, and observing the Sun, you take the Altitude at noon 60 degrees, 30 min. and his declination then is 20 deg. 15 min. South-wards, but then not having observed long before, you know not whether you are to the South-wards of the Equinoctial, or to the Southwards of the said line: to know which, let the Sun by your Compass, and mark which way the shadow of the Sun steeleth: for if he casteth his shadow the same way that the Declination is, then is the Sun betwixt the Equinoctial and you, your self being also the same way that the Suns Declination is: and therefore subtracting the Declination 24 deg. 15 min. from 60 deg. 30 min. the Peridian Altitude, rests 36 deg. 15 min. the height of the Equinoctial, the complement whereof 49 deg. 45 min. is the Elevation of the North Pole: but if the Sun casts his shadow contrary to his declination,

clination, that is to say, If having South Declination, his shadow goeth Southward, or having South declination, it cast his shadow Southward: Then either the Equinoctial shall be betwixt you and the Sun, or you in the Equinoctial: or else you shall be betwixt the Equinoctial and the Sun: which to know, adde the Declination and the Meridian Altitude for the day proposed together: If the sum of the Addition be lesse then 90 degrees, so much as it wanteth of 90 deg. shall you be distant from the Equinoctial that way which the shadow strecketh: If it be just 90 deg. then are you under the Equinoctial. Again, if your said Meridian Altitude and Declination adden, passeth 90 deg. then so much as is overplus you shall be from the Equinoctial towards the Sun, and then also shall you be betwixt the Equinoctial and the Sun, and if you find the Sun to be in your Zenith, so much as is the Declination, shall you be from the Equinoctial, that way that the Sun declineth: By which reason, if the Sun be in your Zenith, that is, 90 deg. high, and hath no Declination, then are you under the Equinoctial.

How to appropriate the Tables of Declination to any other Meridian.

There is in the oft using the Suns Declination, one principal thing to be considered, which is, that a Table of Declination made for any particular place, doth not serve generally for all places, but only for such places as have the like, or near the same Longitude. The reason is, because that the Declination is calculated according to the true place of the Sun at noon, at which time the Sun is upon the Meridian at that place, for which the said Tables are made: but you must note, that the Sun doth not come to the Meridian in all places at a like time, although that in all places the Sun being upon the Meridian makes the middle of the day. But for every 15 degrees difference of Longitude between any two places, the Sun comes sooner or later to the Meridian, by so many hours. So that if a place be 15 degrees to the Eastward of the place preferred, then the Sun comes sooner to the meridian by an hour, and if it be deg. to the Westward, later by an hour. And so consequently more or less, according to the difference of Longitude. By which reason, in what part of the world soever you be, you may work for the Declination of the Sun in that place by a proportional parts of 24 hours declination to the hours of diff. in Longit.

Example, Being in Brasilia (a part of the West-Indies) the 10 of

April 1660, whose meridian is distant from the meridian of England to the Westward about 45 degrees, which is 3 hours of time that the Sun should come to the meridian later there than here at London where the Table is made: For when it is 12 a clock here, it is but 9 there; and being noon there, it is 3 a clock here. Therefore to apply this Table to that place, I find the declination for the day aforesaid, under our meridian to be 11 deg. 55 min. at noon, and by reason, that when it is 12 a clock at Brasilia, it is then at London 3 hours past. Therefore, by the Rule of Proportion, I seek what declination the Sun hath at 3 a clock in the afternoon, as followeth, I take the difference of the declination betwixen the day aforesaid, and the next following, which is 20 min. then I say, by the rule of 3, if 24 hours gives 20 min, what gives 3 hours, the time of the difference in Longitude: Facit 2 min. and 30 seconds, which (because the declination increases) I add to the number of the day proposed: so I conclude, the declination of the Sun to be the 10 of April at noon in the Kingdom of Brasilia 11 deg. 57 min. and a half.

Again, the day and time aforesaid, in the Bay of St. Sebastian, whose Longitude is 58 deg. to the Eastward of London, answering near to 4 hours of time, shewing that the Sun comes sooner to the meridian in the Bay of St. Sebastian, by 4 hours then at London, by which reason the declination is less there than at London, because the declination both increase: For if the declination did decrease, it would be more there than at London: and to know the declination of the Sun in the Bay aforesaid: I take the difference betwixt the declination of the 10 of April, and the declination of the day next, before being 20 minutes. Then (I say) if 24 hours give 20 min. what 4 hours? Facit 3 min. 20 sec. which deducted from 11 deg. 55 min. the Declination of the Sun the 10 of April aforesaid at London, leaveth 11 deg. 15 min. 50 sec. The Declination of the Sun at noon in the Bay of St. Sebastian, being that when it is 12 of the clock there, it is but 8 a clock at London, or in any place having the same Longitude. Because this appropriating of the Declination, to any other meridian is so necessary; I have first in the Kalender, set down the daily difference of the declination, between the two Sections in either page, which will indifferently serve for both; And I have also added this Table of proportion, for your more ready finding how much you must add

The Sea-man's Kalender.

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to, or subtract from the Declination in the Kalender. The work is the same as in the former Examples, only this Table will save your labour in working by the Rule of Three, and so needs no farther Example.

A Table to proportion the Suns Declinations to any time of the day, or to any other Meridian.

The daily difference of the Declination being

Minutes	2	4	6	8	10	12	14	16	18	20	22	24
The hours from noon, or difference of Meridian, Error W.												
1	5	10	15	20	25	30	35	40	45	50	55	1 00
2	10	20	30	40	50	1 00	1 10	1 20	1 30	1 40	1 50	2 00
3	15	30	45	1 00	1 15	1 30	1 45	2 00	2 15	2 30	2 45	3 00
4	20	40	1 00	1 20	1 40	2 00	2 20	2 40	3 00	3 20	3 40	4 00
5	25	50	1 15	1 40	2 05	2 30	2 55	3 20	3 45	4 10	4 35	5 00
6	30	1 00	1 30	2 00	2 30	3 00	3 30	4 00	4 30	5 00	5 30	6 00
7	35	1 10	1 45	2 20	2 55	3 30	4 05	4 40	5 15	5 50	6 25	7 00
8	40	1 20	2 00	2 40	3 20	4 00	4 40	5 20	6 00	6 40	7 20	8 00
9	45	1 30	2 15	3 00	3 45	4 30	5 15	6 00	6 45	7 30	8 15	9 00
10	50	1 40	2 30	3 20	4 10	5 00	5 50	6 40	7 30	8 20	9 10	10 00
11	55	1 50	2 45	3 40	4 35	5 30	6 25	7 20	8 15	9 10	10 05	11 00
12	00	2 00	3 00	4 00	5 00	6 00	7 00	8 00	9 00	10 00	11 00	12 00

How to observe the height of the Pole by the Stars.

The working thereof by the Starres to find the height of the Pole, is all alike with the working thereof by the Sun, for if you observe any Star upon the Meridian: look in the Table of the fixed Stars for the name of the Star which you observed, where you shall finde his Declination either North or South, and the right Ascension thereof in deg. and hundred parts, and having taken the Altitude of any Star upon the Meridian, you have nothing to mark in the Table for this, but the Declination, which if it be North, take the Declination of the Star from the height thereof: The remainder taken from 90, leaveth the height of the Pole: but if the Star hath South Declination, adde the Declination to the Altitude taken, and the Product thereof taken from 90, leaves the height of the Pole: Also to find the time of any Stars coming to the

the Meridian, is set down after the Tables of the Suns right Ascension, but for the first day of every moneth, you have it in the Table of the stars, . . . Example.

The 25 of November, I observed a Star of the second bignesse in the wing of Pegasus, or the Flying Horse, about 8 a clock in the evening, and found the Meridian Altitude thereof to be 51 deg. 52 min. and the Table of the fixed Stars, I find the said Star to have 13 deg. 24 min. South Declination: which taken from 51 deg. 45 min. the height observed, leaves 38 deg. 28 min. the height of the Equinoctial, the complement whereof 51 deg. 32 min. is the height of the North Pole at London.

And so consequently for all those Stars, whose Declination is taken from the Equinoctial: but for those Stars which are any thing near to the Pole, whose distance or Declination is counted from the Pole, their working is thus: You must note, that being farre to the Southward, some of those Stars will be twice upon the meridian, viz. once above the Pole, and once under the Pole: therefore if you observe any Star upon the Meridian under the Pole, adde the distance of the said Star from the Pole to your Altitude observed, the total is the height of the Pole: But if you observe any Star upon the Meridian above the Pole, so much as is the distance or declination of the said Star from the Pole, you must take from the Altitude taken, the remainder is the height of the Pole.

As for Example.

If at London you observe the former Guard Starre beneath the Pole upon the Meridian, you shall find it to be 37 deg. 16 min. to which if you adde 14 deg. 22 min. the distance of the said Star from the Pole: the total is 51 deg. 32 min. the height of the North Pole at London. Again, the same Star observed upon the Meridian above the Pole is 65 deg. 54 min. from which 14 deg. 22 min. the distance aforesaid taken, leaveth 51 deg. 32 min. the distance aforesaid taken, leaveth 51 deg. 32 min. as before.

Note that being far Southward, those Stars between the Equinoctial and Tropick of Cancer are best to observe, and being between the said Tropick and the Equinoctial, those Stars above the Pole are fittest for observation, and for those that travel far beyond the Line to the Southwards, the like order must be kept by the Stars between the Equinoctial, and the Tropick of Capricorn, and those that are near the South Pole.

Of

Of the North Star.

Whereas the North Star being very neer the Pole, (and by report) is of most Seamen made much use of for observation, in our Northern Navigations, considering the great use that hath been made thereof, there hath formerly been two Tables set forth for this purpose; the one after a more general way as supposing, little or no difference in any Latitude; the other with some allowance for the difference of the height of this Star in several Latitudes: which though it be not much; for it is but 3 min. in the Latitude of 40 deg. and but 4 min. in the latitude of 50 degrees, & but 6 min. in the Latitude of 60 deg. (which is as far as these observations can well be used; yet this difference is not to be neglected & therefore I have joyned both Tables in one, having corrected them according to the true Declin. of this Star from the Pole, for the year 1660, which is 2 deg. 30 min.

But herein take special notice, how you must reckon these points of the Compass, which in the old Tables was not well directed, and so subject to be mistaken. Therefore in this Table I begin at that part of the Meridian which lies directly under the Pole, which may most properly be called the North, and so proceed point by point, as the Guard and the other Stars make their revolution about the Pole, ascending from it is lowest or North point of the Meridian, to the North-east, and so to the East, and from thence to the South-east, and so to the South, or highest point of their ascending, being directly over the Pole: From this South or highest point they descend again by the West, and so return to the North againe.

I give you the more notice hereof, because this Table herein differs from both the former Tables, which indeed are so confused in it, that I know not how to direct you herein; but this I am sure is most plain and proper; especially all the while the Guards are under the Pole, from the West on the left hand, to the East on the right: and though at the highest the Guards do not come to the Southward of our Zenith; yet then they may more properly be said, to be more Southward, when they are on this side the Pole, and so neerer to the Zenith.

Lastly, take this as a general rule to guide you and to prevent mistakes; That the first of the Guards of the little Bear, which is the Star you are to observe, is almost in an opposition to the Pole Star: So that when the Guard Star is under the Pole; then the Pole Star is above the Pole, and when the Guard Star is above the Pole, then the Pole Star is under the Pole; so many degrees and minutes as the Table shews you.

The use of this Table is thus, when you would observe the altitude of the North Star, mark as neer as you may (or rather observe with a Quadrant made on purpose, upon what point of the Compass the former Guard of the little Bear is, (reckoning the points of the Compass therein, according to the foresaid rules,) and if the said Star be not just upon a full point of the Compass, then stay a little longer, till it come to some one of them; and then observe the height of the Pole Star as exactly as you can. Then by the way of your Ship, knowing within a degree or two what latitude you are in, consider which of these Latitudes set down in the top of the Table,

ble, is that which you are nearest to; and use that. And now if you find the point of the Compass which the Guard Star is upon, in the first column of the Table, in that very line under the column of your Latitude, you shall find how many degrees and minutes, the Pole Star is either above or below the Pole, according to the direction of the last column of the Table; which you must thus make use of. If the Star be any thing above the Pole, subtract the number in the Table, from the height of the Star observed; but if the Star be under the Pole, then add the number found in the Table to the height observed, and so you shall have the true height of the Pole.

Thus if (without having any respect to the Latitude) you shall see the Guard Star to be just Northeast from the Pole Star, and by observation find the height thereof to be 50 deg. 0 min. look out this point Northeast in the Table, and against it in the next column marked (o) Latitude you shall find that the Star is 0 deg. 39 min. above the Pole, and this now subtracted from the foresaid height 50 deg. there remains 49 deg. 21 min. for the height of the Pole.

But if you will be more exact, and have respect to the Latitude which you are in, which you may suppose to be about 50 deg. then look in this line of Northeast for the Column under 50, & there you shall find that the Pole Star is only 35 min. above the Pole, and this subtracted from the foresaid height of 50 degrees, leaves the true latitude to be 49 deg. 25 min. which differs 4 min. from the former, and is so much the more exact.

But if the Guard Star had been Southwest, then the Pole Star had been 39 min. (or more exactly) 44 min. under the Pole, which being added to the height 50 deg. the Latitude should be 50 degrees, 39 minutes, or more exactly 50 degrees, 44 minutes.

And now having made plain unto you the use and profit of the said Table, it being indeed so necessary and commodious for the Mariners use as any rule whatsoever: it rests now to speak somewhat more particularly of the other fixed Stars, set down in the Tables following; wherein are in the first Page eleven Columns, the first is the number of the Stars, which are 65, the second is their Names, the third is their Magnitudes, either the 1, 2, 3, 4, Magnitude; the fourth is their Right Ascensions in degrees and hundred parts; the fifth is their Difference of their Right Ascensions for 1000 years; the sixth is their Declination in degrees and min. the seventh is the name of their Declination, S. signifying South, and N. signifying North; the eighth is their Difference of their Declination for 1000 years: The ninth sheweth their difference of Declination to be added or subtracted, A. signifying to add, and S. to subtract. In the 10 and 11 Columns, and so along over the second Page at the top of the Column, are the names of the 12 Months, and under them in the Columns of every Month are the Hours, and hundred parts of an hour, that any of these Stars come to the Meridian the first day of every month, the letter M. sheweth the hour to be between Midnight and noon, & the letter A. sheweth the hour to be between noon and Midnight. Next after the Table of the Stars follows a Table of the Suns Right Ascension in hours and hundred parts, the use of which Tables follows after the Tables.

A Table of the North Star.

In these several Latitudes.

	Poi. of the Compass.	In these several Latitudes.						
		0	20	30	40	50	60	70
		D M	D M	D M	D M	D M	D M	D M
If the former of the Guards be ascending from the N. or lower part of the Meridian.	North	2 10	2 10	2 10	2 9	2 9	2 8	2 7
	N by E.	1 53	1 53	1 53	1 52	1 52	1 51	1 49
	NNE	1 31	1 31	1 30	1 30	1 29	1 28	1 25
	NE by N	1 6	1 5	1 4	1 3	1 2	1 1	0 58
	Northeast	0 39	0 38	0 37	0 36	0 35	0 33	0 30
	NE by E	0 10	0 9	0 8	0 7	0 6	0 4	0 1
	E NE	0 18	0 19	0 20	0 21	0 22	0 23	0 26
	E by N	0 49	0 50	0 50	0 51	0 52	0 53	0 56
	East	1 15	1 15	1 16	1 17	1 18	1 19	1 21
	S by S	1 38	1 39	1 39	1 40	1 41	1 42	1 44
	ESE	2 0	2 0	2 0	2 0	2 1	2 2	2 3
	SE by E	2 15	2 15	2 15	2 15	2 16	2 16	2 16
	Southeast	2 25	2 25	2 25	2 25	2 25	2 25	2 25
	SE by S	2 30	2 30	2 30	2 30	2 30	2 30	2 30
	SS E	2 29	2 29	2 29	2 29	2 29	2 29	2 29
	S by E	2 22	2 22	2 22	2 22	2 22	2 22	2 22
If the former of the Guards be descending from the S. or upper part of the Meridian.	South	2 10	2 10	2 10	2 14	2 11	2 11	2 12
	S by W	1 53	1 53	1 54	1 53	1 55	1 55	1 57
	SS W	1 31	1 32	1 32	1 39	1 34	1 35	1 38
	SW by S	1 7	1 7	1 8	1 6	1 10	1 11	1 13
	Southwest	0 39	0 40	0 41	0 4	0 43	0 44	0 47
	SW by W	0 16	0 11	0 12	0 13	0 14	0 16	0 19
	WSW	0 19	0 18	0 17	0 16	0 15	0 13	0 10
	W by S	0 48	0 47	0 42	0 45	0 44	0 42	0 43
	West	1 15	1 14	1 13	1 13	1 11	1 10	1 8
	W by N	1 39	1 39	1 38	1 37	1 36	1 35	1 33
	WNW	2 00	1 59	1 59	1 58	1 58	1 57	1 56
	NW by W	2 15	2 15	2 14	2 14	2 14	2 13	2 12
	North-west	2 25	2 25	2 25	2 25	2 25	2 24	2 24
	NW by N	2 30	2 30	2 30	2 30	2 30	2 30	2 30
	NNW	2 29	2 29	2 29	2 29	2 29	2 29	2 29
	N by W	2 22	2 22	2 22	2 22	2 22	2 21	2 21

Of Declin. Above the Pole

The Pole Star is
under the Pole.

Above the Pole.

The *Right Ascension* and *Declination* of 65 of the principal
Moneth, with the difference of their Right

Number.	For the year 1660. <i>Names.</i>	Magnitude.	Right	Dif.	decli	N	Dif	Janu- ary.	Febru- ary.	
			Ascen- sion,	100 year	on.	o: S.	100 year			
			D. prs.	d. pt.	D.M.	M	H. prs.			H. pts.
1	North in the Whales tail	3	00	60	1 30	10 41	S 34	S	4 48	2 34
2	South in the Whales tail	2	06	62	1 27	19 51	S 34	S	4 88	2 74
3	The Pole star	2	08	19	1 82	87 30	N 34	A	4 90	2 76
4	South in <i>Andromeda's</i> Girdle	2	12	67	1 39	33 52	N 33	A	5 29	3 15
5	In <i>Cassiopeias</i> knee	3	16	02	1 58	58 27	N 33	A	5 51	3 36
6	South in the Rams horn	3	23	77	1 38	17 38	N 31	A	6 03	3 88
7	North in the Rams horn	3	23	98	1 37	19 09	N 31	A	6 03	3 89
8	The Rams head	3	27	07	1 42	21 51	N 30	A	6 23	4 09
9	Brightest in the Whales jaw	2	41	17	1 25	02 44	N 25	A	7 18	5 04
10	The head of <i>Medusa</i>	2	43	60	1 61	39 37	N 25	A	7 21	5 07
11	<i>Perseus</i> right side	2	44	92	1 47	48 35	N 21	A	7 45	5 29
12	After in <i>Perseus</i> left foot	3	53	29	1 57	20 52	N 20	A	7 99	7 85
13	The Bulls eye	1	64	15	1 45	15 47	N 10	A	8 71	6 57
14	The Goate <i>Hircus</i>	1	72	75	1 81	45 36	N 10	A	9 29	7 15
15	<i>Orions</i> left foot	1	74	62	1 25	08 37	S 09	S	9 40	7 26
16	<i>Orions</i> left shoulder	2	76	77	1 35	06 00	N 07	A	9 55	7 41
17	First in <i>Orions</i> Girdle	2	78	74	1 28	00 35	S 07	S	9 66	7 52
18	The Wagons right shoulder	2	83	82	1 91	44 52	N 04	A	10 35	8 21
19	<i>Orions</i> right shoulder	2	84	27	1 37	07 18	N 04	A	10 07	8 91
20	Brightest in <i>Pollux</i> feet	2	94	52	1 47	16 39	N 02	S	10 74	8 60
21	The great Dog	1	97	55	1 14	16 33	S 04	A	10 94	8 80
22	First head of <i>Gemini</i> , <i>Castor</i>	2	08	20	1 74	32 34	N 11	S	11 65	9 51
23	The little Dog	1	10	42	1 35	06 05	N 12	S	11 80	9 66

fixed Stars, & their coming to South the first day of every
Ascension and Declination for 100 Years.

Marc.	April	May.	June.	July.	Aug- ust.	Septe- mber.	Octo- ber.	Nove- mber.	Dece- mber	Numbers.
H.pts.	H.pts.	H.pts.	H.pts.	H.pts.	H.pt.	H.pts.	H.pts.	H.pts.	H.pts.	
A	M	M	M	M	M	M	A	A	A	
0 57	10 69	8 81	6 72	4 65	2 62	0 72	10 91	8 92	6 78	1
0 97	11 09	9 21	7 12	5 05	3 02	1 12	11 31	9 32	7 18	2
0 99	11 11	9 23	7 14	5 07	3 04	1 14	11 33	9 34	7 20	3
1 38	11 50	9 62	7 53	5 46	3 43	1 53	11 72	9 73	7 59	4
1 59	11 71	9 83	7 74	5 67	3 64	1 74	11 93	9 97	7 80	5
A	A	M					M			
2 11	0 23	10 35	8 26	6 19	4 16	2 26	0 45	10 46	8 32	6
2 12	0 24	10 36	8 27	6 20	4 17	2 27	0 46	10 47	8 33	7
2 32	0 44	10 56	8 47	6 40	4 37	2 47	0 66	10 67	8 53	8
3 27	1 39	11 51	9 42	7 35	5 32	3 42	1 61	11 62	9 48	9
3 30	1 42	11 54	9 45	7 38	5 35	3 45	1 64	11 65	9 51	10
3 52	1 64	11 76	9 67	7 60	5 57	3 67	1 86	11 67	9 73	11
A	A	M					M			
4 08	2 20	0 32	10 23	8 16	6 13	4 23	2 42	0 43	10 29	12
4 80	2 91	1 04	10 95	8 88	6 87	4 95	3 14	1 15	11 01	13
5 38	3 50	1 62	11 53	9 46	7 43	5 53	3 72	1 73	11 59	14
5 49	3 61	1 73	11 64	9 57	7 54	5 64	3 83	1 84	11 70	15
5 64	3 76	1 88	11 79	9 72	7 69	5 79	3 98	1 99	11 85	16
5 75	3 87	1 89	11 90	9 83	7 80	5 90	4 09	2 10	11 56	17
A	A	M					M			
6 44	4 56	2 68	0 59	10 52	08 49	6 59	4 78	2 79	0 65	18
6 14	4 26	2 38	0 29	10 22	08 19	6 39	4 48	2 49	0 35	19
6 83	4 95	3 07	0 96	10 98	08 88	6 98	5 17	3 18	1 04	20
7 03	5 15	3 27	1 18	11 11	09 08	7 18	5 37	3 38	1 24	21
7 74	6 86	3 98	1 89	11 82	09 79	7 89	6 08	4 09	1 91	22
7 89	6 01	4 13	2 04	11 97	09 94	8 04	6 23	4 22	2 10	23

The *Right Ascension* and *Declination* of 65 of the principal
Moneth, with the difference of their Right

Number.	For the year 1660. Names.	Magnitude.	Right	Dis.	decli	N	Diff.	Janu- ary.	Febru- ar y.	
			ascen- tion.	100 year	nati on.	o 100	S.			year
			D. prs.	d. pr.	D.M.	M				
14	Second head <i>Gemini</i> , <i>Castor</i>	2	11 17	1 59	28 48	N	12 S	11 84	9 70	
15	Souther. Arm, the Crab,	3	12 27	1 39	13 08	N	22 S	M		
26	Hydras heart	1	13 77	1 25	07 12	S	25 A	1 16	10 96	
								1 61	11 48	
27	Lyons hearr,	1	14 7 59	1 37	13 36	N	29 S	M		
28	Lyons neck, highest	2	14 43	1 47	25 05	N	29 S	2 27	0 13	
29	Great Bears side	2	16 17	1 62	58 12	N	32 S	2 35	0 21	
30	Great Bears back	2	16 64	1 67	63 35	N	33 S	3 11	0 97	
31	Lyons back	2	16 03	1 45	22 22	N	34 S	3 14	1 00	
								3 36	1 22	
32	Lyons tail	1	17 2 55	1 33	16 28	N	34 S			
33	Great Bears thigh	2	17 3 89	1 38	55 36	N	34 S	3 97	1 83	
34	First in the Ravens wing	3	17 8 81	1 03	15 37	S	34 A	4 03	1 89	
35	First in the great Bears tail	2	18 9 72	1 15	57 50	N	34 S	4 43	2 19	
36	Virgins Spike	1	19 6 87	1 32	09 21	S	33 A	5 09	3 95	
								5 56	3 42	
37	Secd in the great Bears tail	2	19 7 54	1 04	56 44	N	33 S	5 61	3 47	
38	Third in the great Bear tail	2	20 3 52	1 03	51 03	N	30 S			
39	Centaurus right shoulder	3	20 6 73	1 48	35 16	S	30 A	6 01	3 87	
40	Arcturus	1	21 10 10	1 20	21 01	N	30 S	6 22	4 08	
41	South Ballance	2	21 8 08	1 39	14 34	S	27 A	6 41	4 31	
42	Formost Guard,	2	22 8 21	1 17	75 38	N	25 S	6 97	4 83	
43	North Ballance	2	22 4 74	1 35	08 05	S	24 A	7 32	5 18	
								7 37	5 23	
44	Brightest North Crown	2	23 0 08	1 07	27 53	N	22 S	7 78	5 64	

fixed Stars, & their coming to South the first day of every
Ascension and Declination for 100 Years.

Marc.	April	May	June	July	August.	September.	October.	November.	December.	Number
H. pts	H. pts.	H. pts.	H. pts.	H. pts.	H. pts.	H. pts.	H. pts.	H. pts.	H. pts.	
A	A	A	A	A	M	M	M	M	M	
7 93	6 05	4 17	2 08	0 01	9 98	8 08	6 27	4 28	2 14	24
9 19	7 31	5 43	3 34	1 27	11 24	9 34	7 53	5 54	3 40	25
9 71	7 83	5 95	3 86	1 79	11 76	9 86	8 05	6 06	3 92	26
					A					
10 36	8 48	6 60	4 51	2 44	0 41	10 51	8 79	6 71	4 57	27
10 44	8 56	6 68	4 59	2 52	0 49	10 59	8 78	6 79	4 65	28
11 20	9 32	6 44	5 35	3 18	1 25	11 35	9 54	7 55	5 41	29
11 23	9 35	7 47	5 38	3 31	1 28	11 38	9 57	7 58	5 44	30
11 45	9 67	7 69	5 60	3 53	1 50	11 60	9 79	7 80	5 66	31
M					A					
0 06	10 18	8 30	6 21	4 14	2 11	0 21	10 40	8 41	6 27	32
0 12	10 24	8 36	6 27	4 20	2 17	0 27	10 46	8 47	6 33	33
0 52	10 64	8 76	6 67	4 60	2 57	0 67	10 86	8 87	6 74	34
1 18	11 30	9 42	7 33	5 26	3 23	1 33	11 52	9 53	7 39	35
1 65	11 77	9 89	7 80	5 73	3 70	1 80	12 99	10 00	7 86	36
						A				
1 70	11 82	9 94	7 85	5 78	3 75	1 85	0 04	10 05	7 91	37
M										
2 10	0 22	10 34	8 25	6 18	4 15	2 25	0 44	10 45	8 31	38
2 31	0 43	10 55	8 46	6 39	4 36	2 46	0 65	10 66	8 51	39
2 54	0 66	10 78	8 69	6 62	4 56	2 66	0 88	10 89	8 75	40
3 06	1 18	11 30	9 21	7 14	5 11	3 21	1 40	11 41	9 27	41
3 41	1 53	11 65	9 56	7 49	5 46	3 56	1 75	11 76	9 62	42
3 46	1 58	11 70	9 61	7 54	5 51	3 61	1 80	11 81	9 67	43
							A			
3 87	1 99	00 11	10 2	7 95	5 92	4 02	2 21	10 22	10 08	44

The *Right Ascension* and *Declination* of 65 of the principal
Moneth, with the difference of their Right

Numbers.	For the year 1660. Names.	Magnitude.	Right Ascen- sion.	Dif- fer- ence year	Decl- ination.	N. or S.	Diff. 100 year	Janu- ary.	
								H.pts.	H.pts.
								M	A
45	Brightest of Serpents neck	2	231 95	1 23	07 33	N	21 S	7 91	5 77
46	Hindmost Guard, <i>Subi</i>	2	231 30	0 30	73 16	N	20 S	7 88	5 78
47	The Scorpions heart	1	242 12	1 55	25 36	S	16 A	8 58	6 44
48	Serpentarius right knee	3	252 33	0 83	15 13	S	10 A	9 29	7 15
49	Hercules head	3	254 79	1 13	14 50	N	8 S	9 43	7 29
50	Sagittarius arrow head	3	266 22	1 62	30 06	S	02 A	10 18	8 04
51	The Dragons head	3	267 21	0 83	51 36	N	04 A	10 26	8 12
52	The Harp	1	276 37	0 85	38 30	N	04 A	10 87	8 73
53	The Swans bill	3	289 29	1 03	27 17	N	12 A	11 71	9 56
54	Sagittarius left thigh	3	293 50	1 67	35 27	S	14 S	11 60	9 86
55	The Vultures heart, <i>Alkair</i> ,	3	293 58	1 28	08 02	N	14 A	0 01	9 87
56	The Swans tail	2	307 48	0 86	44 06	N	20 A	0 94	10 80
57	The Dolphins head	3	307 76	1 19	14 57	N	21 A	0 96	10 82
58	Pegasus mouth	3	321 95	1 30	08 21	N	26 A	1 90	11 76
59	Last in the tail of Capricorn	3	322 12	1 41	17 35	S	27 S	2 91	11 77
60	Fomahant	1	339 62	1 42	31 20	S	31 S	3 08	0 94
61	Pegasus right shoulder <i>Scheat</i>	2	341 87	1 20	26 15	N	32 A	3 16	1 09
62	Pegasus wing	2	342 00	1 16	13 24	N	32 A	3 24	1 40
63	Head of Andromeda	2	357 70	1 29	27 14	N	34 A	4 20	2 15
64	Brightest Cassiopeia's Chair	3	357 83	1 27	57 18	N	33 A	4 29	2 15
65	Pegasus wing Tip, <i>Scheat</i>	2	359 00	1 27	13 18	N	33 A	4 39	2 25

fixed Stars, and their coming to South the first day of every
Ascension and Declination for 100 Years.

Marc.	April	May	June	July	Aug- ust.	Septe- mber.	Octo- ber.	Nove- mber.	Decem- ber.	Number.
H. pts.	H. pts.	H. pts.	H. pts.	H. pts.	H. pts.	H. pts.	H. pts.	H. pts.	H. pts.	
M	M	M	A	A	A	A	A	A	M	
4 00	2 12	0 24	10 15	8 08	6 05	4 15	2 34	0 35	10 21	45
4 01	2 13	0 25	10 16	8 09	6 06	4 16	2 35	0 36	10 22	46
4 67	2 79	0 91	10 82	8 71	6 72	4 82	3 01	1 02	10 88	47
5 38	3 50	1 62	11 53	9 46	7 44	5 54	3 72	1 73	11 59	48
5 52	3 64	1 76	11 67	9 60	7 58	5 68	3 86	1 87	11 73	49
			M						A	
6 27	4 39	2 51	0 42	10 35	8 32	6 42	4 62	2 62	0 48	50
6 35	4 47	2 59	0 50	10 43	8 40	6 50	4 68	2 70	0 56	51
6 91	5 08	3 20	1 11	11 04	9 01	7 11	5 30	3 31	1 17	52
7 82	5 94	4 06	1 97	11 97	9 87	7 97	6 16	4 17	2 03	53
			M							
8 09	6 21	4 33	2 24	0 17	10 14	8 24	6 43	4 44	2 30	54
8 10	6 22	4 34	2 25	0 18	10 15	8 25	6 44	4 45	2 31	55
9 03	7 15	5 27	3 18	1 11	11 08	9 18	7 37	5 38	3 14	56
9 05	7 17	5 29	3 20	1 13	11 10	9 20	7 39	5 40	3 26	57
			M							
9 99	8 11	6 23	4 14	2 07	0 04	10 14	8 33	6 44	4 20	58
0 00	8 12	6 24	4 15	2 08	0 05	10 15	8 34	6 35	4 21	59
11 17	9 29	7 41	5 32	3 25	1 22	11 32	9 51	7 52	5 38	60
11 32	9 44	7 56	5 47	3 40	1 37	11 47	9 66	7 67	5 53	61
11 33	9 45	7 57	5 48	3 41	1 38	11 48	9 67	7 68	5 54	62
	A					M				
10 38	10 50	8 62	6 53	4 46	2 43	00 53	10 72	8 73	6 59	63
0 38	10 50	8 62	6 53	4 46	2 43	00 53	10 72	8 73	6 59	64
0 48	10 60	8 74	6 63	4 56	2 53	00 63	10 82	10 83	6 67	65

A Table of the Right Ascension of the Sunne every day at Noon, in hours, and hundred parts.

Dates	January		Februa.		March.		April		May		June	
	H. parts.		H. parts		H. parts		H. parts		H. parts		H. parts	
1	19	54	21	68	23	45	1	33	3	21	5	30
2	19	61	21	75	23	51	1	39	3	28	5	37
3	19	68	21	81	23	57	1	45	3	34	5	44
4	19	76	21	88	23	63	1	51	3	41	5	51
5	19	83	21	94	23	69	1	57	3	47	5	57
6	19	90	22	01	23	75	1	63	3	54	5	64
7	19	97	22	07	23	81	1	69	3	61	5	71
8	20	04	22	23	23	87	1	76	3	67	5	78
9	20	11	22	20	23	93	1	82	3	74	5	85
10	20	18	22	26	24	00	1	88	3	80	5	92
11	20	25	22	33	24	06	1	94	3	87	5	99
12	20	33	22	39	24	12	2	00	3	94	6	06
13	20	40	22	45	24	18	2	07	4	00	6	13
14	20	47	22	52	24	24	2	13	4	07	6	20
15	20	53	22	58	24	30	2	19	4	14	6	27
16	20	60	22	64	24	36	2	25	4	21	6	34
17	20	67	22	71	24	42	2	32	4	27	6	41
18	20	74	22	77	24	48	2	38	4	34	6	47
19	20	81	22	83	24	54	2	44	4	41	6	54
20	20	88	22	89	24	60	2	51	4	48	6	61
21	20	95	22	96	24	66	2	57	4	54	6	68
22	21	01	23	02	24	72	2	63	4	61	6	75
23	21	08	23	08	24	78	2	70	4	68	6	82
24	21	15	23	14	24	84	2	76	4	75	6	89
25	21	22	23	20	24	90	2	82	4	82	6	96
26	21	28	23	26	24	96	2	89	4	89	7	02
27	21	35	23	32	1	02	2	95	4	95	7	09
28	21	42	23	39	1	08	2	02	4	02	7	16
29	21	48			1	14	3	08	5	09	7	23
30	21	55			1	20	3	15	5	19	7	30
31	21	61			1	27			5	23		

A Table of the Right Ascension of the Sunne every day at Noon, in hours, and hundred parts.

Date	July	August	Septem.	Octob.	Novem.	Decemb
	H. parts.	H. parts	H. parts	H. parts	H. parts	H. parts
1	7 37	9 40	11 30	13 11	15 10	17 24
2	7 43	9 46	11 36	13 17	15 17	17 31
3	7 50	9 52	11 42	13 23	15 24	17 38
4	7 57	9 59	11 48	13 29	15 31	17 46
5	7 64	9 65	11 54	13 35	15 38	17 53
6	7 70	9 71	11 60	13 42	15 45	17 61
7	7 77	9 78	11 66	13 48	15 51	17 68
8	7 84	9 84	11 71	13 54	15 58	17 75
9	7 90	9 90	11 77	13 60	15 65	17 83
10	7 97	9 96	11 83	13 67	15 72	17 90
11	8 04	10 02	11 89	13 73	15 79	17 98
12	8 10	10 08	11 95	13 80	15 86	18 05
13	8 17	10 15	12 01	13 86	15 93	18 13
14	8 24	10 21	12 07	13 92	16 01	18 20
15	8 30	10 27	12 13	13 98	16 08	18 27
16	8 37	10 33	12 19	14 05	16 11	18 35
17	8 43	10 39	12 25	14 11	16 22	18 42
18	8 50	10 45	12 31	14 18	16 29	18 50
19	8 57	10 51	12 38	14 24	16 36	18 57
20	8 63	10 57	12 44	14 31	16 43	18 64
21	8 69	10 63	12 50	14 37	16 51	18 72
22	8 76	10 69	12 56	14 42	16 58	18 79
23	8 82	10 75	12 62	14 50	16 65	18 87
24	8 89	10 81	12 68	14 57	16 72	18 94
25	8 94	10 88	12 74	14 63	16 80	18 01
26	9 02	10 94	12 80	14 70	16 87	19 09
27	9 08	11 00	12 86	14 77	16 94	19 16
28	9 15	11 06	12 92	14 83	17 02	19 23
29	9 21	11 12	12 98	14 90	17 09	19 30
30	9 27	11 18	13 04	14 97	17 16	19 38
31	9 34	11 24		15 04		19 46

A description of the former Table of the Suns Right Ascension.



I think it not amisse, before I shew the use of the former Table of Right Ascension, for the finding of the time of any Star coming to the Meridian, to explain unto you what we call Right Ascension.

Know therefore, that in the Sphere there is right Ascension, oblique Ascension, and mean Ascension, which have all several definitions: but the rest being impertinent I will onely speak of Right Ascension, which is thus defined: Right Ascension is that portion of Equinoctial which cometh to the Meridian of P^{er}son. Read with any Star, or any part of the Ecclyptick: or more plainly, it is that number of degrees of the Equinoctial, comprised betwixt the Vernal Equinoctial point, or intersection of the said Equinoctial circle, and the first min. of Aries, and that Star or part of the Ecclyptique, which is upon the Meridian at the day or time desired. As for your better understanding, if the beginning of Aries be upon the Meridian, or any point or Star in the said beginning of Aries, then hath the said point or Star so situated no right Ascension at all, by reason that the beginning of the Equinoctial cometh to the Meridian therewith: But if the beginning of Cancer, or any Starre in that situation be upon the Meridian, then is there with it under the same Meridian 90 degrees of the Equinoctial, or 6 hours of time, being that every 15 degrees of the Equinoctial answers to one hour of time. Knowing that the Star or point which is in the beginning of Aries shall come to the Meridian 6 hours sooner then that other, which is in the beginning of Cancer, and so others: I doubt not but that these few words will suffice to give you the better light to that which followes. First therefore, to find the Right Ascension of the Sun at any time look for the Sun in the head of the Table, and for the day of the Moneth, at the left side of that face, where the Moneth desired is, & in the common Angle answering to them both is the hour and minute of the Suns right ascension.

The

The use of the former Tables of the fixed Stars; and of
the Suns Right Ascension.

This Table of the fixed Stars is reduced from 77 Stars to 65, which yet will be no lesse unto the Sea-man. For those Stars which are left out are either very small, (and so not fit for observation) or else they are such as are so far to the Southwards that they could not be observed by Tycho, or any of the European Mathematicians, whose Observations are Authentical, and by his means there is very great difference in their accounts: As for Example the two chiefest Stars left out are the last of Eridanus and Canopus, belonging to the Constellation of Argo, which are indeed Stars of the first Magnitude, and therefore if it were possible to have their true places, they would be of good use. But seeing some account the last of Eridanus to be in 21 deg. 10 min. V. and Latitude South 23 deg. 30 min. and others account it in 9 deg. 45 m. N. and Latitude South 59 deg. 30 min. while the truth is better known we need not relpe upon such an uncertainty, having so many other Stars fit for Observation. So likewise for Canopus some reckon it to be in 8 deg. S. and South Latitude 75 deg. others allow it 69 deg. of Latitude.

Instead of these two I have added to the Table a Star of the second Magnitude, in the Tip of the wing of Pegasus, a Star so fit for observation, that Mr. Guoter maketh choice of it for one of the five Stars to be set upon his Quadrant. And all these Stars have their allowance of Right Ascension and Declination for an hundred yeares; by which you may rectifie them in time to come. And because the time runs away so fast, even before we are aware, I have set down their places somewhat for ward, viz. for the year 1660, and so this Table will need no rectification till the year 1670.

To find the time of any Stars coming to the Perseidan the first day of every moneth, seek the number of the Star in the first column of the left hand Page, and seek the same number in the last column of the right hand Page, and in the same line under the names of the moneths you shall see the hour and hundredeth part that the Star comes to the Perseidan.

Example. I do desire to know at what time the Bulls eye comes to the Meridian the first of January, I look in the first column of the left hand page, and I find his number 13, then I look 13 in the last column of the right hand Page, and right under January in the same line, I find 8 houres, and 71 hundred parts, and because I find the letter A next over head, I see it is afternoon, that is, 8 of the clock at night and 71 hundred parts, which is near three quarters of an hour, and so of all other.

But if I desire to know the time of this Stars coming to the Meridian the 21 of January: first, I look in the Table of the Suns right Ascension, and I find the Suns right Ascension to be the first of January 19 hours & 54 parts, and the 21 of January I find it to be 20 hours, and 95 parts, the difference is 1 hour 41 parts, which I subtract from 8 hours 71 parts, the time of the Stars coming to the Meridian the first of January, and the remainder is 7 a clock, and 30 parts, that is, more then one quarter of an hour, the time of the Stars coming to the Meridian the 21 of January, & the like of all other.

But if the difference of the Suns right Ascension between the first day of the moneth, and the day you desire to know the time of of the Stars coming to the Meridian, be more then the time of the Stars coming to the Meridian the first day of the moneth, you must adde 12 hours to it; as if I would know what time the Valures heart comes to the Meridian the 16 of July, the first of July it comes to the Meridian 0 hours 18 parts of an hour after midnight: the Suns right ascension the first of July is 7 hours 37 parts, the 16 of July it is 8 hours 37 parts, the difference is 1 hour, which I subtract from 12 hours and 18 parts, the remainder is 11 hours 18 parts at night, the time of the Stars coming to the Meridian the 16 of July, and the like of all other.

Again, here you may see by the Tables what number of these Stars are in rule for observation at any time. Example.

I desire to know how many of these Stars are in rule for observation the first of January, I look in the Table, & I find the second Star, that is, the Southermost in the Whales-tail, to come to the Meridian at 4 a clock and 88 parts afternoon, that is, near 5 of the clock in the evening, about which time the Stars begin first to appear: and so I follow on under the moneth of January, until I come to

to 6 a clock 1 part in the morning, that is, the 38 Star, which is the third in the Great Bears tail, between which and the fourth star are 36 Stars that are in the rule for observation the first of January.

To rectifie the Right Ascension of any of those stars, whose difference is given, to any time within 100 years.

I desire to know the right ascension of Orions right shoulder in the year 1686. Subtract 1660 out of 1686, the difference is 26: then say, if 100 years give 1 deg. 37 parts for the difference of Right ascension, what shall 26 years give? and you shall find 0 deg. 35 parts fere, which added to 84 deg. 27 parts, the right ascension of the said Star in the year 1660, the sum is 84 deg. 62 parts, the right ascension of the same Star in the year 1686, and the like of all other.

To rectifie the Declination of any of those Stars that have the difference given to any time within 100 years.

Example. I desire to know the declination of the Pole-star for the year 1667, I subtract 1660 out of 1667, the difference is 7. then say, if 100 years give 34 min. for the difference of Declination (as you may see in the Table) what shall 7 years give? and you shall find 2 min. 38 parts, which is to be added, as you may see by the letter A in the last column, to 87 deg. 30 min. the declination of the Pole-star for the year 1660, and the whole is 87 deg. 32 min. the Declination of the Pole-star for the year 1667. This way of rectifying the right Ascension and Declination, I doubt not but it shall meet with some captious censures, but I know the defect between this and Calculation, cannot be so palpable as theirs in censuring: howbeit, in the mean-time we may see that the former Tables for these Stars that I have calculated, must be renewed again at most in 20 years, or else errors will be in their use.

HAVING sufficiently explained unto you the manner and way, how both by the Sun and Stars to attain to the true height of the Pole, or Latitude of any place, I purpose now (God willing) to speak somewhat of the Longitude, which as the former is most easie, and the finding thereof known almost to all Sea-men, so is the other as uncertain, and hath not yet hitherto been found out or known exactly to any, albeit that many learned men, and of great experience, have laboured very earnestly for the same, and many good means have they invented, as helps and assistance unto

Partners.

Partners in their long Navigations and Travels, by which though with great labour, care and industry, they transport themselves to the utmost Regions of the world: with far more ease and facility they might do it, if they could as perfectly and readily find the Longitude at all times, as they may the Latitude, for then having sailed many dayes in unknown parts upon the large and spacious Seas, and incurring all those in-durable troubles, miseries, and unspeakable calamities, which do for the most part attend upon long Voyages; yet after all this, if upon the first fair opportunity they could readily with the Latitude find also the Longitude, their fore-passed troubles would be joyfully remedied, being that these two (like loving sisters) would apply such pleasing comfort to their cold stomacks, after their tedious travels, by giving them the true pick or place of their then present being, Peter Apian, and Gemma Frisius hath written thereof, as also some others; but truly in my opinion, it was never brought to so exquisite perfection, as is now adayes: and for me to write thereof were bus as it were to set up a Candle at noon dayes, rather to shew mine own folly, then to lighten those that know a better way then my self: in which doing, well may Apelles saying, Ne ultra ultra crepidam, be applyed unto me, but for my excuse, I do entreat the judicious to perswade themselves that it is far from my thought to set down any thing in this for a present unto them, but onely in good will to shew my opinion thereof to the ignorant, being as followeth.

First, therefore the Latitude being known, by finding the Longitude also, you have the true pick or place in the Globe, or Card where your ship is, which to find the neerest is two wayes; one by dead Reckoning, the other by observation; but dead Reckoning (as they call it) being as I take it most used, I will speak first thereof, by which, if it were possible that this Reckoning could exactly and precisely be kept, it would give both Latitude and Longitude without any Observation at all: The different Latitude being onely the distance that the ship is departed from the Parallel where she last was, either Northward or Southward: and Longit. being the distance that she is departed from the Meridian either Eastward or Westward: For the knowledge whereof, these things are principally to be considered. First,

First, the true place of the Ships being at the beginning of the Voyage.

Secondly, a sound and experimented judgment of the way that the Ship maketh with every Shift of winde.

Thirdly, to know exactly how much the Compasse both varie from the true North or South point, upon which the Needle is toucht either Eastward or Westward, in as many several places as conveniently may be obserued.

Fourthly, to note diligently the Floods or Currents, which may cause the ships way to be more Leeward, or otherwisse then expectation, and to give allowance of her course and way accordingly.

Fifthly, the several points of the Compasse that she makes her course good upon, and what way she hath made upon every point.

Sixthly, to bring those several Courses into one straight line, thereby to know what Course she hath made good with the nearest distance upon the said Point or Rumb, that she hath made her way good upon.

And lastly, knowing how many leagues doth raise or lay a degree upon the said Rumb, and true reckoning of your said Course and distance gives you the difference of Latitude, or the Parallel where the Ship then is: and also knowing how many leagues answer to a deg. of E. and W. in the said Parallel, the Course, Distance, and Latitude gives y^e difference of Longitude or the Meridian, under which the Ship then is, the intersection of which said Parallel and Meridian is the place of the Ships then being, of which things I will speak more particularly afterward.

Now it remaineth to speak something of knowing the Longitude onely by obseruation which is very necessary to be known, that thereby the one may make trial of the other, being that if the account by dead reckoning, & also by Obseruation do both agree in the Latitude and Longitude, then you may be well assured, that you know truly the place where you then are, which Longitude by obseruation is thus known: prepare a very perfect and true running glasse, which may precisely runne 24 hours without error, and about the time that you purpose to set sail, set the said glasse

Glasse a running juſt at 12 a clock, when the Sun is upon the Meridian: being run out, be ſure to turn the ſaid glaſſe inſtantly as it is out: not loſing any time in the turning of it, & ſo having very carefully kept the ſaid glaſſe till you think good to make an obſervation, at which time it is requiſite to have in readineſſe an half hour glaſſe and a minute glaſſe, that if the 24 hour-glaſſe be out before the Sun comes to the Meridian, then ſo ſoon as it is out, to turn the half hour glaſſe or minute-glaſſe, as you ſee occaſion, thereby to know preſently, how much the 24 hour-glaſſe is out before the Sun comes to the Meridian: for if the Sun is upon the Meridian juſt when the 24 hour-glaſſe is out, then you may aſſure your ſelfe that you have ſailed North and South, and are ſtill under the ſame Meridian you were at the firſt, but if the 24 hour-glaſſe be out before the Sun comes to the Meridian; for every four minutes that the glaſſe is out before noon, your difference of Longitude is 1 degree to the Weſtward, and for every hour 15 degrees.

And contrary, if the Sun comes to the Meridian before the glaſſe is out, then according to the ſame proportion of time is your difference of Longitude to the Eaſtward, which difference of Longitude, if you multiply by the number of miles anſwerable to a degree of Longitude in that Latitude, where you then find your ſelf to be the Product gives the miles of the diſtance, that you are either to the Eaſtward or Weſtward of the Meridian that you are departed from.

The like may alſo be effected by any of thoſe fixed ſtars, whoſe true time of coming to the Meridian you know: for if the account of time preſiſely kept by your glaſſe, and the ſtars coming to the Meridian, as you find in your Table of right Aſcenſion do juſtly agree, then are you ſtill under one and the ſame Meridian, but if the time be paſt by your account, that the ſaid Star ſhould be upon the Meridian before the Star doth come to the Meridian; for every hour that the Star comes to the Meridian after the ſaid time paſt, your difference of Longitude is 15 deg. to the Weſtward, and for every hour that the Star comes to the Meridian before by your account of time truly kept, it ſhould be upon the Meridian, your difference of Longitude is 15 deg. to the Eaſtward.

Although

Although the Author of this Book in his time, knew of no other means to attain the Longitude, then by such as he hath here published, and by the Eclipses which seldome happen, yet seeing it hath pleased God since his time to reveal a manifest way (which cannot be stopped, but it will come to perfection) to attain the Longitude; I suppose it necessary to speak something of it, because it falls out so fit in this place.

There are wayes which are not imaginay (as some affirme) but real and grounded upon as certain natural principles, as any Mathematical conclusions whatsoever in Geography or Navigation.

And howsoever many may expect some excellent way for it from foreign parts, by certain small stars near Jupiter, and that some here at home would have the world conceited of a way by Celestiall Observation, yet it is without doubt: the Longitude must be found by Observation made of something below the Moon; for I do truly affirm, that there are Magneticall Poles, whose Latitude and Longitude I do as certainly know, as concurrent Observations and Arithmetical Calculations can discover them, and their annual motion I know, and by consequence the time of their Revolution. It may be objected, that the variation in many, nay in most places are very irregular, and not according to such Magneticall Poles as I speak of, for in some places on the same Parallel in equal spaces, it altereth much swifter then in other, besides in the Parallel of London, there is two degr. 00 Easterly variation to the Eastwards of London, and 2 degr. 00 Easterly variation to the Westwards of London; and yet both these places are to the Eastwards of the first Meridian of the world, within 45 deg. 0 min. of Longitude. It is true, but all this I can very well resolve, and I doubt not but to do it for all places: moreover there are some places within a certain Longitude, whose variations continue constant for hundreds of years, and yet afterwards do vary as ours here at London doth now, but at London it is never constant, although in former time the Variation of it was not sensible, it is now in its swiftest motion. It were to be wished (that as many
D
noble

noble minded men have been at charge oftentimes to adventure towards the seeking out of a passage Northwest into the South Sea, that some nobly minded would take this into consideration, or that some noble men furnished with convenient and exact Instruments might make Observation to the Westwards: for the more full prosecuting of this work, it would make much for their lasting Fame, and for the honour of this Kingdome; but because I am confined to a little room, I must abruptly end my discourse of Longitude, only take notice, that those that live until the year of our Lord 1657, shall not see any variation at all at London, and afterwards it will increase Westerly at least for 50 years.

This being written by Mr. Bond 20 years ago, is come to passe exactly, so that in July 1657 it was observed there was no variation at London, and now the Variation will begin to be Westerly, and will increase Westerly about 11 min. every year for the first 30 or 40 years, but afterward the motion will not be so fast. The period of the motion is 370 years.

Of the Variation of the Compasse.

Concerning the Variation of the Compasse it hath been very learnedly treated on by others of our Countrey men, & in our vulgar tongue, and namely by Mr. Norman and Mr. Burrowes in their Books called the New Attractive and Variation of the Compasse: and since that most excellently and ingeniously written of, by that rare and learned Mathematician of our time Mr. Wright, in his Book of the Correction of Errours in Navigation, as also in his Translation, called the Haven-finding Art: In which respect it is needlesse for me here to write any thing thereof, onely let it suffice to speak a little thereof, and being necessary to the knowledge of the foregoing matter, for them that would willingly note how much the Compasse doth varie in several places of their sailing, I think it best to have the Pivels of their Compasses touched upon a good Stone, & so placed directly under the N. point of the Fly, without allowing any Variation at all, the outer edge of the said Fly to be graduated to each quarter into 90 degrees, for the ready reckoning of the degrees that the Compasse doth vary from the true N. or S. either towards the E. or W. Over which Fly, it is necessary to have

a round circle of glass with two sights upon the same, the one directly against the other at opposite points to be raised perpendicularly where occasion shall serve, which circle with the sights thereon, as I have said, being placed upon the glass over the Fly within the box, where the Compass is: when you would observe the variation of the Compass, just either at the Sun rising or setting, turn the sights in the glass Circle towards the Sun, & looking through the same mark precisely how many degr. the Sun riseth or setteth from the E. or W. point of the Fly or Compass: so if the Sun be in the Equinoctial, having then no amplitude, so much as is the difference of the Suns rising or setting from the E. or W. points, shewed by the Compass, is the Variation of the Compass from the true S. or N. but if the Sun be either to the Northward or Southward of the Equinoctial, having Amplitude, then is there a respect also to be had to the Suns Amplitude: as thus, if y^e Sun hath North or South Amplitude, and that you observe the Sun to rise or set so much from the East or West point of the Compass, as is the Suns Amplitude, and likewise the same way that the Amplitude is, then hath the Compass no variation: but if the Sun having North Amplitude, riseth notwithstanding more Northerly by your Compass, then by the said Amplitude it should do, the degrees of true Amplitude deducted from the Amplitude which the Compass sheweth, leaveth the variation of the Compass to be Eastwards of the North; but if the true Amplitude be greater then the Compass sheweth, the one deducted from the other, leaveth the Variation to the Westward of the North; and if the Amplitude be Southerly, and the Compass shew the Sun to rise Northerly, both the differences added together, gives the variation Easterly: or if the Amplitude be Northerly, and the Compass shews it to be Southerly, then both the differences added together, give the variation Westerly. All this is to be understood, when you observe by the Amplitude Orive, viz. at the Suns rising: so if you observe the setting thereof, then by adding or deducting the differences between the true Amplitude known, and the Amplitude given by the Compass, the totall or remainder shewes the Compass to varie so much to the contrary side; an Example will

See
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Sines.

make all this plain unto you, which let it be thus proposed, Suppose that being at Sea, you find by the Table of * Sines hereafter set down (or by some other means) the Suns Amplitude at that time to be 20 degrees to the Northward, and setting the Sun at his rising by the Compass (as is before shewed) you finde that the Sun riseth 35 deg. to the Northward of the East, which is somewhat to the Northwards of the Northeast and by East point, therefore subtracting 20 deg. the Suns true Amplitude from 35 deg. the Amplitude which the Compass sheweth, the remainder being 15 deg. sheweth the Compass to be so much varied from the North to the Eastward, which is one whole point, and above $\frac{1}{2}$: otherwise the Sun having the same Amplitude Southerly (as is aforesaid) and setting him at his going down by the Compass, the said Compass sheweth him to set onely 5 degrees to the Northward of the West, which deducted from 20 deg. the true Amplitude leaveth 15 deg. for the variation of the Compass to the Eastward, as before.

As for Example.

Suppose that the Sun having 23 degrees of South Amplitude, and the Compass sheweth the Amplitude or rising to be 11 degrees Northerly, above 23 deg. the true Amplitude, with 11 deg. of contrary Amplitude, which the Compass sheweth, and the Product 34 degrees, being three whole points and somewhat more, sheweth that the Compass is so much varied from the true North to the Eastward.

Again, the Sun having the same Amplitude Southerly, you observe at his setting, and find by your Compass that he setteth 11 deg. Northerly, adding the two Amplitudes as aforesaid, 23 and 11, the Product 34 sheweth the variation so much to the Westward, being that in the Observation at his rising, $\frac{1}{2}$ E. and by N. points of the Compass, standeth where the East Southeast should be: and at his setting in the other Observation, the West and by North points of the Compass pointeth to the Sun, in which place should be the West Southwest points.

These few words will suffice, being (that albeit to the ignorant they seem somewhat dark) yet in the practice thereof, they shall find it, doubt not, but very plain and easie for their understanding: other.

otherwise there are sundry sorts of Instruments to find the Variation by, but others having already written thereof. I have thought good also to shew my opinion of this plain and easie way, knowing that the Mariner, having made experience of many twares, will onely use that which he findeth best, both for their ease profit and truth thereof. And note that whatsoever is here spoken concerning the finding of the Variation by the Amplitude, the very like may be observed by the Azimuth, which by the Sun or Stars being to be seen may at any time be known.

How many leagues sailing upon any point of the Compasse, will raise or lay a degree of Latitude, and what departure from the Meridian you make thereof.

This is so common in every Book, that I need not to write thereof, but only being that it is a necessary help to that which hath been before spoken of, it is not amiss to set it here down, being as followeth.

First, sailing S. or N. you keep still one Peridian: Here note that although the Authour hath set down 20 English leagues, yet it must be 20 such leagues, as answer to a deg. of the Meridian; and therefore the Knots on the Log-line must be 50 foot asunder at least according to the late experiment made by Mr. Richard Norwood, which experiment was formerly verified by practice at Sea, by Captaine Thomas James in his voyage to the Northwest, as we may see in the 7 page of his Journal by the Course, Distance, and Latitudes from the *Blakes* (on the West of Ireland) to Cape Farewell, compared with Mr. Norwoods Experiment.

Upon the second point of Rumb from N. to S. 21 leagues & one third, raise or lay a deg. of Latitude and your distance from the Peridian is 8 leag. and one third. Sailing upon the third point 24 leagues to raise or lay a degree and distance from the first Peridian is 13 leagues and one third.

But because many will hardly be drawn to alter their knots from their old Form. Therefore if any man will multiply 112 by the Knots run out in half a minute, the Product, cutting off two Figures to the right hand, shall be the number of leagues run in a Watch, according to Mr. Norwoods Experiment.

Upon

Upon the fourth point 28 leagues and one third raise 02 lay a degree of Latitude, and distance from the Meridian is 20 leagues.

Upon the fifth point 36 leagues raise 02 lay a degree of Latitude, and distance from the Meridian is 30 leagues.

Sailing upon the first point 02 Rumb 52 leagues and one third raise 02 lay a degree, and having altered your Latitude one degree upon that point you are departed from the first Meridian 48 leagues and one third.

If you sail upon the seventh point, being the next from the East 02 West, you may sail 102 leagues and 2 thirds, before you raise 02 lay the Pole one degree, and then are you 101 leagues from your first Meridian, but if you sail East 02 West, then are you still in a parallel, and neither raise nor lay the Pole at all.

To finde the Distance between any two places, knowing the Longitude and Latitude of them.

If the two places differ onely in Latitude, then are they both under one and the same Meridian: and to know the distance betwixt them in miles 02 leagues, multiply the number of the degrees of difference by 60 miles 02 20 leagues, the Product of which multiplication gives the true distance between them in miles 02 leagues, according as you work them, being that 60 miles 02 20 leagues make 1 degree of a great Circle: but if the one place have N. Latitude, and the other S. then adde both their Latitudes together, and work as aforesaid: and if both the places are under the Equinoctial, they have then no Latitude. And there likewise 60 miles 02 20 leagues makes 1 degree, and the working like the former, if the difference be under 180 degrees. For if the difference be more then 180, subtract the said difference from 360; and multiply the remainder by 60 02 20, as before.

These are so plain and easie that they need no Example: but if they differ both in Longitude and Latitude, 02 in Longitude onely in any parallel beside the Equinoctial, the working is somewhat more difficult, by reason that the further the Parallels are distant from the Equinoctial towards either of the Poles, the shorter they are, and the shorter the Parallels are, the fewer miles make

a deg. so that whereas in the Equinoctial 60 miles make one degree; yet in our Latitude, where the pole is raised about 52 degrees, in this parallel 37 miles make a degree, and so every 37 miles East or West in this parallel, are so many degrees; For which purpose, I have here added a Table shewing the miles of distance answerable to a deg. in every several latitude from the Equinoctial towards either of the Poles: and when you know the miles answerable to a degree in the Parallel desired, if the difference of the two places be onely in longitude, multiply the difference of their longitude by the number of miles answerable to a degree: and the Product sheweth the distance in English or Italian miles betwixt the said two places.

Example.

London and Middleborough have both in a manner one latitude, viz. about 52 deg. and I find in this Table that in the Parallel of 52 deg. 37 miles make a deg. of Longitude, the longit. of London is 25 deg. 50 min. which subtracted one from another leaves 3 deg. 50 min. for the difference of longit. Then multiplying 3 deg. by 37 miles, the Product is 111 miles: Then for 50 min. I say by the Rule of 3, If 60 min. gives 37 miles, what gives 50 minutes? Facit near 31, which added to 111, makes 142 miles, or 47 leag. and a mile, for the distance betwixt London and Middleborough.

But if the two places differ both in longitude and latitude, then is the working more difficult then either of the former: For first, you must take the difference of the two places in longitude, and then their difference also in latit. then multiply the difference of latitude of the two places by 60, and set the Product thereof by it self for the first number: then multiply

Deg. of Latit.	M. to a Deg.	Deg. of Latit.	M. to a Deg.
0	50	60	30
10	59	61	29
15	58	62	28
18	57	63	27
21	6	64	26
24	55	65	25
26	54	67	24
28	53	68	23
30	52	69	22
32	51	70	21
34	50	71	20
35	49	72	19
37	48	73	18
38	47	74	17
40	46	75	16
41	45	76	15
42	44	77	14
44	43	78	13
46	42	79	12
47	41	80	11
48	40	81	10
49	39	82	9
51	38	83	8
52	37	84	7
53	36	85	6
54	35	86	5
55	34	87	4
57	33	88	3
58	32	89	2
59	31	90	1

difference of Longit. by the number of miles answerable to each Latit. severally, and adde both the Products together: the half whereof set down for your second number, and multiplying each of the said two numbers into it self squarely, adde both the Products together, and extracting the square root thereof, the said square root is the distance betwixt the two places desired.

As for Example.

To go directly in a right line from Calice in France, to Constantinople in Grecia; I find by the Tables following, that the Longitude of Calice is 90 deg. 10 min. and the Latitude thereof 50 deg. 10 min. And the Longitude of Constantinople is 61 deg. 20 min. and the Latitude 44 degrees. Constantino. 61 degrees 00 min. 40 min. then subtracting the Calice 29 degrees 10 min. lesser longit. from the greater, Difference, 32 degrees 10 min. the Difference of Lon. Calice 50 degrees 40 min. gitude is 32 deg. 10 min. Constantino. 44 degrees 40 min. Also I take the one Latit. Difference 6 degrees 00 min.

tude from the other, and there rests 6 deg. for the difference thereof, which 6 deg. multiplied by 60 miles produceth 360 miles for the distance betwixt the Parallel of Calice, and the Parallel of Constantinople. Now for the distance betwixt Calice and the Perfoian of Constantinople, I multiply 32 degrees 10 min. the difference of Longitude by 38, the miles answerable to a degree in the Parallel of Calice, and the Product is 122 miles: Then multiply 32 degrees 10 minutes, the aforesaid difference of Longitude by 42 miles answering to a degree in the Parallel of Constantinople, the Product is 1351 miles: These two distances added together, make 2573, the half whereof, being 1286 is the mean distance betwixt the Perfoians of the said two places: So have you two numbers, viz. 60 miles, the distance that the parallel of Constantinople is to the Southwards of Calice, & 1286 miles, the distance that Constantinople is to the Eastward of the parallel of Calice: Wherefore if you multiply 360 into it self, the product is 129600. And likewise multiplying 1286 into it self, the product is

1222

1351

2573

1286

is

The Sea-mans Kalender.

111

The manner how to extract the Square and Cube Root of any number, is more plainly taught, towards the end of the Book.

is 1633796, which both added together, make 1633796
1783396, the square root of which number is the 129600
distance desired: Which to help those that are
not perfect in extraction of roots, I have here set
down the working thereof, as followeth:

First, I set down the proposed number, with 1783396
a Quotient, and under the last figure I put a
pick: and so likewise under each other figure
toward the left hand, leaving betwixt each pick one figure un-
picked: So have I under this number 4 picks, signifying that
the root must consist of four figures, and to find them out, I seek
what is the greatest square number over the first pick, which is
1, therefore I put 1 in the quotient for the first 1783396(1
figure of the Root, and cancel the figure o-
ver the first pick, then to find the second figure
of the Root, I multiply the Quotient by 20,
which being 1, both neither multiply nor divide;
therefore I seek how often 20 is contained in 78,
the number of the second pick, which you must
take no oftner then that the Square of the said
number being added therewith, may be likewise
taken there-from; so I see that 20 times 20 be-
ing 60, and the Square of 3 which is 9 ad-
ded thereto, is 69, which may be taken
there-from; therefore I put 3 in the Quo- 2783396(13
tient, taking 69 from 78, the number over the 2, 2
pick, leaves 933 to the 3 pick: then for the 69
third figure of the Root I multiply 13 the Quo-
tient by 20, the product is 260, which I seek how
often it may be taken out of 933, and I find that
3 times 260 is 780, whereunto the Square of 3
being added, makes 786, therefore I put 3 in
the Quotient, and subtracting 786 from 933,
rests 1446 for the 4 pick, then for the last fi-
gure of the Root, I multiply 133 the whole
Quotient already found by 20, and the Product
is 2660, which may be taken 5 times in 14496; 69
for five times 2660 is 13300; unto which 25 789

20
1
—
20
3
60
—
9
69

13
20
—
200
3
—
790
1
9
844 789
—
2783396(133
133
20
the

the Square of 5 added, makes 23325.

Therefore I put 5 in the quotient for the fourth and last figure of the Root, making my Subtraction as before, the work will stand as you see, by which you may know y^e square root of y^e proposed number to be 1335 & very near $\frac{1}{2}$. so I conclude y^e true distance between Calice and Constantinople to be 1335 miles, and near $\frac{1}{2}$ a mile. The manner how to extract the root of any number is set down more at large after the Tables of Sines.

$$\begin{array}{r}
 789 \quad 2660 \\
 \hline
 5 \\
 \hline
 13300 \\
 \hline
 25 \\
 \hline
 511 \\
 54471 \quad | \quad 13322 \\
 \hline
 17823 \quad | \quad 1335 \\
 \hline
 13325
 \end{array}$$

But for the finding of the Distance of Places, here followes an easier way and more natural by the Table of *Sines*, which will be necessary to make use of the Table of *Longitudes* & *Latitudes*, as also to make trial of the Difference that is between the true distance of Places as they are upon the *Globe*; and as most of them are laid down upon the plain *Sea-card*.

1 If one place be under the Equinodial, and the other have Latitude, and their difference of Longitude be 90 deg. 0 min. then their distance asunder is 90 deg. 0 min.

2 If one place be under the Equinodial, and the other have Latitude, and their difference of longitude be more than 90 deg. 0 min. subtract 90 deg. from it, and seek the sine of the remainder, and adde it to 10000, and multiply the Sum by the sine of the Complement of the latitude of the other place, cutting off 4 figures to the right hand from the product, and from the rest subtract the sine of the Complement of the Latitude given, and the remainder shall be the sine of the complement of the Distance between the two places, unto the arch of which sine adde 90 deg. 0 min. and the whole is the distance required.

But if their difference of Longitude be lesse then 90 deg. 0 min. subtract it out of 90 deg. 0 min. and seek the sine of the remainder, and multiply it by the sine of the complement of the latitude given cutting off 4 figures to the right hand from the Product, & the rest is the sine of the complement of y^e distance between the two places

3 If both places have Latitude, adde one Latitude to the Complement of the other, and seek the sine of the summe, which sine keep. Then if the difference of Longitude be more then 90 deg. 0 min. seek the sine of the excess above 90 deg. 0 min. and adde it to 10000. which sum keep, but if it be less than 90 deg. 0 min. seek the sine of the Complement of it, and subtract it from 10000, and keep the remainer, next multiply the sum kept, or this remainer by the sine of the Complement of one Latitude, cutting off 4 figures to the right hand of the Product, and the rest multiply by the sine of the Complement of the other Latitude, cutting off also 4 figures to the right hand of the Product, and take the difference between this last Product and the sine of the sum of the Complement of one Latitude added to the other Latitude, which difference shall be the sine of the Complement of the distance between the two places.

Note, if the last Product be equal to the sine of the summe of the Complement of one Latitude added to the other Latitude, the two places are 90 deg. 0 min. distant asunder, but if it be less than the said sine, they are less then 90 deg. 0 min. asunder, but if it be more than the said sine, then the former difference is the sine of the excess above 90 deg. 0 min. unto which adde 90 deg. 0 min. and the whole is the distance required.

Example of the second.

The Island of S. Thomas under the Equinoctial Longit. 38 deg. 0 min. and Java minor Long. 151 deg. 0 min. and Lat. 8 deg. 0 min. difference of the Long. 113 deg. 0 min. the excess above 90 deg. 0 min. is 23 deg. 0 min. the sine 3908, which added to 10000, the sum is 13908, the Complement of the Latit. given 82 deg. 0 min. the sine is 9903, which multiplied by 13908; the Product is, cutting off 4 figures to the right hand, 13373, from which subtract 19903, the sine of the Complement of the Latitude; the remainer is 3870, the sine of 22 deg. 46 min. unto which adde 90 deg. 0 min. and the whole is 112 deg. 46 min. which multiplied by 60, and 46 min. added is 6766 miles, the distance of the two places.

Example of the third.

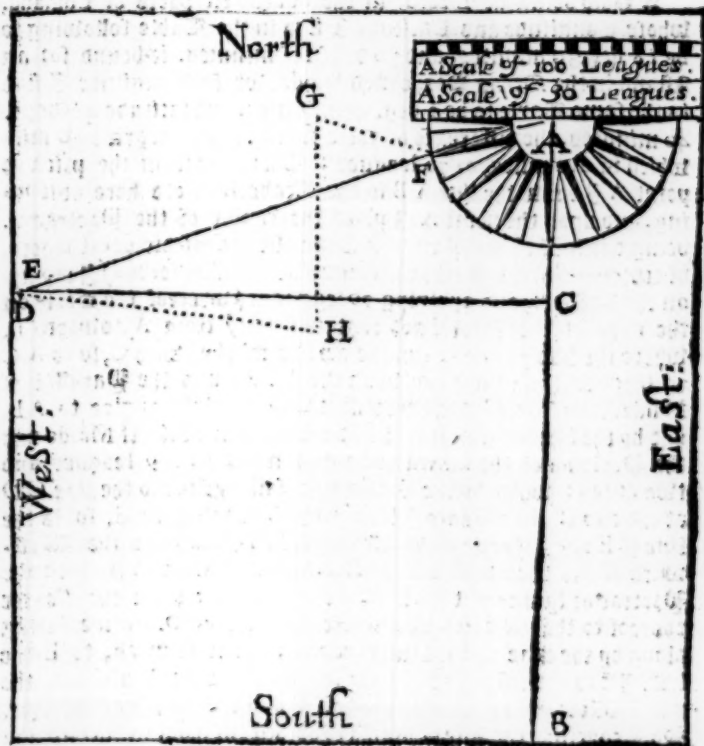
Nova Zembla Longit. 83 deg. 29 min. and Latit 47 deg. 6 min.

and New Plymouth in New England, Longit. 305 degrees, 0 min. and Latitude 41 deg. 37 min. lesser Latitude added to the Complement of the greater, the sum is 57 deg. 37 min. whose line is 8445, the difference of Longit. 128 deg. 29 min. the excess above 90 deg. 0 min. is 38 deg. 29 min. whose line is 623, which added to 10000, the sum is 10623; which multiplied by 7476, the line of the Complement of 41 deg. 37 min. the Product is 12128. And this multiplied again by 2756, the line of the Complement of 74 deg. 0 min. the last Product is 3341, which subtracted from the line of the sum above Latitude, and added to the Complement of the other Latitude, viz. the line of 57 deg. 37 min. that is, 8445, and the remainder is 5103, the line of 30 deg. 41 min. whose Complement is 59 deg. 19 min. which being multiplied by 60, makes 3559 miles, the distance required.

The ingenious Mariners may sail by knowing the true Longitude and Latit. of places, to any place assigned as well by a blank of paper or past-board as by his Sea-card by the help of a Protractor in this manner: First, upon the board or paper lined with Meridians & Parallels and unto them can make a right Angle upon any pick or point, a sheet of clean paper is sufficient to keep a Table upon. To know your course from the place where you are to any other place assigned, according to plain Sea-card as I say upon your board or paper make a pick for the place where you then are, & from the said pick draw a right line to represent a Meridian of the same place: Then placing the Center of the Protractor upon the said pick lay the N or S point of the slip or Protractor as a place beareth, upon the line ready drawn. Then by the last Chapter learn the distance of miles betwixt the place where you are, and the Parallel of that place you are bound to: or more briefly what portion of the Meridian is comprised between the Latitude of the two places: that distance by the Scale of the Protractor, applyed to a Meridian by you drawn, and where the distance ends, draw another line square, or at right angles to the other, either East or West, as the situation of the place assigned requireth: and by the former Chapter learn the distance betwixt the Meridian by you drawn, and the Meridian of the other place assigned: which known,

known (by your Scale) apply that distance to your line of East or West, and where that number of distance ends, make another prick for the true situation of your place assigned: then laying a Ruler from the center of the Compass, being the place

Type of a Traverse-board and a Protractor.



where

where you are, and extending it to the other prick last made, the edge of the Ruler or line shews upon the Protractor the point of the Compass that the place assigned bears from the place where you are, and the Scale applied to the said line or edge of the Ruler, shews the distance, also the distance may be known by extracting the square root, as is before shewed in an Example of this, and so for the use of the Traverse-booke, and so an end.

A Ship being at Lizard, in the Southwest parts of England, whose Longitude and Latitude I find in the Table following to be 18 deg. 30 minutes, and 50 deg. 10 minutes, is bound for an Island in the Ocean Sea, called Maida, whose Longitude I find in the same Table to be 2 deg. 40 minutes, and latitude 46 deg. 40 minutes, the difference of their Latitude is 3 degrees 30 min. which is 210 miles, or 70 leagues: Therefore from the prick or point A I draw the line A B in the Traverse-booke here adjoining, and upon the point A I place the center of the Protractor, being one half of the Partners Compass, the middle point whereof representing the North or South, (as occasion serves) I lay upon the line A B, and applying 70 leagues, (whereof the Scale on the edge of the Protractor contains 100) from A towards B, where the said 70 ends, I make a prick marked with C, so is A C 70 leagues, the distance between the Lizard and the Parallel of Maida, then from C I draw the line C D at right angles to A B, and by the former Chapter I find the distance betwixt Maida and the Perisfan of the Lizard to be 629 miles or 209 leagues and two miles: which by the Scale aforesaid applied to the line C D at the end of the distance I set a prick marked with E, so is the line C E 209 $\frac{2}{3}$ leagues, the distance that Maida is to the Westward of the Perisfan of the Lizard, or the line A B, then the Protractor lying as at the first, I lay a Ruler from the Center thereof to the last prick E, and with the former Scale measuring along by the edge of the Ruler from A, the first prick, to E the last, I find the distance to be 222 leagues, and the Ruler cuts the point West and by South, and half a point to the Southwards. So I conclude the Isle of Maida to be distant from the Lizard 222 leagues, and the direct course West and by South, and half a point Southwards.

But

But if the wind be scant or contrary, so that you cannot sail by the direct course; then must you keep a reckoning how many leagues you sail upon every other point; and where you change your course, there place the Center of the Protractor, keeping the Perisbian, or North and South line of the Protractor parallel to the Perisbian drawn on the Traverse-board; and laying a ruler from the Center of the Protractor along that point upon which the Ship maketh her way, and to the edge of the ruler so placed apply so many leagues of the Scale, as the Ship hath sailed upon that point, and then where that number ends, set a prick for the place, where the Ship then is, and again upon that prick place the Center of the Protractor, laying as before the South & North line thereof parallel to the Perisbian, or South line first drawn, and then laying a ruler to the Center of the Protractor, being the place where the Ship then is, and to the place assigned, it shewes upon the Protractor that point how they bear, and Scale applied thereto shewes the distance as in the former Example: Having sailed from the Lizard in the right course 50 leagues, being in the point F, the wind cometh to another point, so that she maketh her way West and by North 40 leagues: at the end of which course is the letter G, from thence she runneth South 75 leagues; at the end of which course is H: then from H, to know the distance, and what course must be kept to the prescribed place of Maids, marked with F, I place the Center of the Protractor upon H, and the edge thereof, which is then North and South parallel or equidistant to the first line AB, which so placed, I lay a Ruler from the Center thereof to E and I finde the Course to be West and half a point to the North 125 leagues.

Note that it is necessary to have upon your Protractor two several Scales a greater and a lesser, for the greater the scale is you keep your reckoning by, the truer shall your accompt be.



Necessary Questions of Navigation, with their Answers.



If I sail from the parallel of 50 degrees 70 leagues upon a Southwest course, I demand how much I lay or depress the Pole, and how many degrees, and leagues I depart from the Meridian?

Ans. Pole depressed 2 deg. 28 min. difference of Longitude 3 deg. 51 min. leagues from the Meri-

an 49 and $\frac{1}{2}$.

Q. 2. If I sail from the parallel of 40 degrees upon a West Northwest course, until I raise the Pole 3 deg. 30 min. I demand how many leagues I have sailed, and how many degrees and leagues I have departed from the Meridian?

A. Leagues sailed 183, difference Longitude 11 deg. 20 min. leagues from the Meridian 169.

Q. 3. From the parallel of 47 deg. if in sailing 108 leagues, between West and North, I raise the Pole 2 deg. I demand upon what Rumb I have sailed? As also how many degrees & leagues I am from the Meridian, from whence I began the Course?

A. A Rumb Northwest and by West, difference of Longitude 6 degrees, 47 minutes, leagues from the Meridian 90.

Q. 4. If from the parallel of 50 deg. I sail so long between North and East, till I raise the Pole 6 deg. difference of longitude 4 deg. I demand upon what point of the Compass I have sailed, and how many leagues I have run?

A. The Course is near N. Northeast, leagues run 130.

Q. 5. If from the parallel of 50 deg. I sail Northwest until the difference of Longitude be 4 deg. I demand how many leagues I have sailed, and how much the Pole is raised?

A. Leagues sailed 70 and two thirds, Pole raised 2 d. $\frac{1}{3}$.

Q. 6. Two ships departing from one place of the Parallel of 50 degrees, the one in sailing 145 leagues towards the West,

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hath raised the Pole 4 d. and the other hath raised the Pole 7 d. and is 95 leagues West from the Meridian of the place from whence he began his course: I demand by what course the said Ships have sailed, how many leagues the 2 Ships have sailed, how far they are asunder, and by what course they may meet?

A. The first Ship hath sailed North-west and by West: the second hath sailed North-west by North 169 leagues, they are asunder 65 leagues and an half, and the course between them is North North-east, and South South-west, more 0 d, 55 min, East, and 0 d, 55 min, West.

Q. 7. Two Ships departing from one place in the parallel of 60 degrees, the one in sailing 145 leagues towards the West, hath raised the Pole 4 d. and the other hath raised the Pole 7 d. and is 93 leagues West from the Meridian of the place from whence he began that course: I demand by what course the said Ships have sailed, the way of the two Ships how far they be asunder, and by what course they may meet?

A. The first hath sailed North-west and by West, the second hath sailed North-west and by North 168 leagues, they are asunder 66 leagues Easterly; Course between them is North North-east, and a half point Easterly.

Q. 8. The two Ships sailing from one place in the parallel of 60 d. the one sailing 180 leagues Eastward, hath raised the Pole 5 d. I demand upon what course, and how many leagues the Ship shall sail to bring himself 50 leagues North by West from the first Ship, and what they are both departed from their Meridian?

A. The first Ship hath sailed North-east and by East, and is departed from the Meridian 14 leagues. The second Ship must sail North-east 2 degrees, North-east leagues 204, and is departed from the Meridian where he began his Course 139 leagues, and 9 tenths.

Q. 9. If I sail from the parallel of 50 d. 100 leagues North, I demand what Latitude I am in?

A. In the Latitude of 55 d.

Q. 10. If I sail from the parallel of 50 d. South, till I lay the Pole 5 d. I demand how many leagues I have sailed?

A. 100 Leagues.

Q. 11. If from Longitude 22 degr. I sail in the parallel of 60 degr. 100 leagues East, I demand what Longitude I am in?

A. 31 Longitude 32 degrees.

Q. 12. If from Longitude 22 degr. I sail in the parallel of 50 degr. to Longitude 10 degr. I demand how many leagues I have sailed?

A. 3 leagues 153 and a half.

Q. 13. If I sail from Longitude 10 degr. and Latitude 40, to Longit. 350 deg. 27 min. and Latitude 30 degrees, I demand the Rumb and Distance?

A. Course West Southwest, distance 522 leagues.

Q. 14. From Longitude 20 degr. and Latitude 45 deg. South-east 20 leagues, what Longit. and Latit. hath the second place?

A. 20 deg. 45 min. Longitude, 45 deg. 42 min. Latitude.

Q. 15. From Longitude 23 degr. and Latitude 45 deg. 42 min. East and North 30 leagues, what Longitude and Latitude hath the second place?

A. 25 deg. 55 min. longitude, 46 deg. latitude.

Q. 16. From Longitude 23 degrees 9 min. and Latit. 45 deg. 59 min. East, Southeast 25 leagues, What Longitude and Latitude hath the second place?

A. 27 deg. 33 min. Longitude, 45 deg. 31 min. latitude.

Q. 17. From Longitude 27 degr. 33 min. and latitude 45 deg. 31 min. North 40 leagues, What longitude and latitude hath the second place?

A. Longitude 27 deg. 33 min. latitude 47 deg. 31 min.

Q. 18. From longitude 27 deg. 33 min. and latitude 47 deg. 31 min. 50 leagues West South-west. What longitude and latitude hath the second place?

A. Longitude 14 deg. 23 min. latitude 48 deg. 28 min.

Q. 19. From Longitude 23 deg. 57 min. and Latitude 48 deg. 28 min. East South-east 60 leagues, What longitude and latitude hath the second place?

A. Longitude 28 deg. 23 min. latitude 49 deg. 36 min.

Here

Here followeth a brief Table of *Sines* for Arithmetical calculation, the total Sine whereof is 10000, with certain necessary Propositions to be wrought thereby, by which few things proposed, and Examples thereto annexed, any one that hath either an ingenious Spirit, or a willing mind to the Practice of the Mathematical Sciences, may attain to much knowledge therein.

A brief Declaration of the same.

What the Table of Sines is, hath been very learnedly explained by others, and therefore needlesse is it for me to discourse thereof; onely take those few Instructions for the help of those, which as yet have no knowledge thereof. First, know that Sailing which is the principal thing here aimed at, is performed by a true and perfect knowledge of the Sphere, by the projection whereof, all Calculations, Tables calculated, and Instruments for Observations are invented, protracted, framed and made.

What the Sphere is, I need not to discourse, the chief of great Circles thereof consisting of 360 degrees, and one quarter thereof being 90 deg. which quarter being taken from the whole Circumference, consisteth of these three particulars, viz. An Arch or part of a Circle being indeed 90 deg. or a quarter of the whole Circle, a right Angle, and two equal sides thereto, of which the one is the base or ground Line, the other a perpendicular let fall thereon at right Angles, the utmost ends or extents of which two lines are the limits of the aforesaid arch or quarter of a Circle: the which three parts so fitted together in their due order betwixt the perfect platform of one quarter of the whole Circle, commonly called a Quadrant: the base or ground line whereof being divided into 1000 equal parts, is Sineus totus, or the whole Sine: and the whole Arch or quarter of a Circle into 90 deg. is the whole Arch belonging to the said whole Sine.

Within which Quadrant any number of deg. or min. counted from the beginning or first perpendicular may be called an Arch or part of a Circle, and another perpendicular let fall therefrom to

the aforesaid base or ground line, the number of equal parts that the said perpendicular saith upon, is the right sine to the arch given: and the Complement of the arch given is the remainder thereof, it being taken from 90 deg. or the whole Quadrant. To find out the right sine of any given arch, look in the head of the Table following for the deg. thereof, and if there be any min. therewith, look for the min. at the left Side of the Table, and carrying your eye downward from the degrees till you come right against them in the number which you find in the common angle or them both, is the right sine of your given arch desired: as if you desire the sine of 35 deg. 20 min. look in the head of the Table for 35, and upon the left side thereof for 20, and in the common square or angle right against them both, you shall find 5783, which is the sine of 35 deg. 20 min. and if you subtract 35 deg. 20 min. from 90 d. the remainder 54 d. 40 min. is the complement thereof, whose right sine (found as before is taught) is 8158: what the versed sine is, and how found out, is afterward shewed, I doubt not but that these few words will suffice for the explaining of the Table following, whose large and ample uses for Navigation, and other the Mathematical practices, these following exemplary Propositions will in some reasonable sort make manifest: by which few here proposed and answered, the ingenious may gather the manifold uses thereof, being that indeed the benefit to be reaped thereby is great, and the Propositions to be wrought thereby infinite. Who so desires more perfection in this kind of Navigation, and generally in all Mathematical practices, let them spend some time in the study of Pitiscus of the Doctrine of Triangles, not long since translated and published in our English tongue by M^r. Ralph Handson.

Certain Propositions to be wrought by the Table of Sines.

The Suns true Place being known, to find his Declination. Prop. 1.

As the whole line, is to the sine of the greatest declination, so is the sine of the Suns distance from the nearest Equinoctial point to the sine of the declination for the day proposed.

Example.

Suppose the true place of the Sun to be in 20 deg. 36 min. of Taurus

The Sea-mans Kalender.

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Taurus, which is 50 d. 36 min. from the beginning of Aries, or the Vernal Equinoctial point; therefore I must multiply the sine of 50 deg. 36 min. the Suns distance from the Equinoctial point by the sine of 23 deg. 32 min. the greatest Declination, and that product must be divided by the whole Sine, whose several Sines being found out in the Table following, and set in order, the work will stand thus,

If 90	gives	23.32	what	50.36	
10000		3993	7727	3083	

Facit 3083, whose nearest Arch 17 deg. 58 min. is the true Declination of the Sun, the day and year asforesaid.

The Declination of the Sun given, to find his place in the Zodiack. Prop. 3.

As the sine of the greatest declination, is to the whole sine, so is the sine of the Declination for the day proposed, to the Sines place or distance from the nearest Equinoctial point.

Example.

Suppose I find that the Declination of the Sun is 17 deg. 58 min. North, therefore I say:

If 23.32	gives	90	what	17.58	
3993		10000	3083	7727	

Facit nearest 7727, whose Arch 50 deg. 36 min. is the Sines distance from the Vernal Equinoctial point of Aries, from which taking 30 deg. the whole sine of Aries, the remainder 20 deg. 36 min. shews the Sun to be so much entred into Taurus, which is the next Signe.

The Latitude of any place and the Declination of the Sun given, to find the Amplitude. Prop. 3.

As the Sine of the Complement of the Latitude, is in proportion to the whole sine, so is the sine of the Sines declination, to the Amplitude.

Example.

The Sines declination being 11 deg. 48 min. North, I desire the Amplitude of the Sun, viz. How much the Sun doth rise and set from the true East and West point of the Horizon, towards the

the North or South in the Latitude of 51 deg. 40 min. to know which, the work is thus.

If 38 deg. 20 min. the Complement of the Latitude give 90 degrees, the arch of the whole line, what gives 11 deg. 48 min. the declination of the Sun.

38 deg. 20 min.	90	11 deg. 48 minutes
6202	10000	2045 3297

Facit 3297, nearest, whose arch sought out in the Table of Sines is 19 deg. 15 min. for the Amplitude of the Suns declination proposed: the same divided by 11 and one quarter, the number of degrees that belongs to a point of the Compass, sheweth one point and 8 deg. which the Sun riseth and sets to the Northward of the East and West, being that the declination is North, for if the declination were South, then were the Amplitude Southerly.

The Declination and Amplitude of the Sun given,
to find the height of the Pole.

Probl. 4.

As the sine of the Amplitude is in proportion to the sine of the Declination, so is the whole Sine, to the sine of the Complement of the Latitude.

Example.

The Declination 11 deg. 43 min. and the Amplitude 19 deg. 7 min. I demand the height of the Pole: Say,

If 19.7 give 11.43 what 90?

3275	2031	10000	6202
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Facit 6202, nearest whose Arch in the Table of Sines being 38 degrees, 40 minutes, is the height of the Equinoctial, or the Complement of the Latitude: What subtracted from 90 deg. leaves 51 deg. 40 min. for the height of the Pole, or Latitude of the place desired.

The true place and Declination of the Sun given, to find the Right Ascension. Probl. 5.

As the sine of the Complement of the Declination is to the total sine, so is the sine of the Complement of the Suns distance from the beginning of Aries, to the Complement of the right ascension.

Example

Example.

I desire the right ascension of the Sun being in 10 degrees, 14 min. of Taurus in which place his Declination is 14 deg. 56 min. and the complement thereof 75 deg. 4 min. and the distance from the beginning of Aries 40 deg. 14 min. whose complement is 49 deg. 46 minutes; I say then,

If 75.54 give 90 What 49.46 minutes?

9663 10000 03 01 7934 7900

Facit 7900: whose arch in the Table of Sines is 52 degrees, 11 min. the complement to thereof 7 deg. 49 min. is the Suns right ascension, the same converted into hours, by allowing 15 deg. to an hour, gives 2 hours, 21 minutes, 26 seconds.

This is to be understood, when the Sun is betwixt the beginning of Aries, and the Tropick of Cancer: for if the Sun be in the Tropick of Cancer, then is the right ascension 90 deg. or 6 hours: and if the Sunne be betwixt the Tropick of Cancer and the Equinoctial point of Libra, subtract the distance that the Sunne is from the beginning of Aries, out of a 180 degrees, and with the remainder work as before for the right ascension, which ascension so found, take from 180, and the remainder is the right ascension desired. But if the Sunne be betwixt the Equinoctial of Libra; and the Tropick of Capricorn, subtract the said distance from the beginning of Aries out of 180 degrees, and if betwixt the Tropick of Capricorn, and the beginning of Aries, take the said distance out of 360 degrees, and then work as before. One Example or two will make all this plain unto you.

The true place of the Sunne being 17 deg. 51 min of Cancer is 107 deg. 51 min. from the beginning of Aries, which taken from 180, leaves 72 deg. 9 min. whose complement is 17 deg. 51 min. the Sunns Declination being then 12 deg. 21 min. the complement thereof is 67 deg. 40 min. I say then,

If 67.40 give 90 What 17.51 minutes?

9250 10000 03 01 3065 3314

Facit 3314, whose arch is 19 deg. 21 min. the complement to thereof 70 deg. 39 min. taken from 180, leaves 109 deg. 21 min. for the right.

right ascension desired, which converted into hours, makes 7 hours 17 min. 24 seconds. Again, I desire the right ascension of 20 deg. 40 min. of Capricorn, whose distance in continual proceeding from the beginning of Aries, being 290 degrees 40 minutes, taken from 360, leaves 69 degrees 20 minutes, with the Complement whereof 20 degrees 40 minutes, and the Complement of the declination of the Sunne upon the same point of the Sunns place 68 degrees 6 minutes, I work as followeth.

It	68.6	gives	90	what	20.40?
	9278		10000	3529	3803

Facit 3803, whose Arch is 22 degrees, 21 minutes, the Complement whereof 67 deg. 39 min. taken from 360, leaves 292 deg. 21 min. for the right ascension desired, the same converted into hours, is 19 hours, 29 minutes, 24 seconds.

The Latitude and Declination of the Sun known, to find the difference ascensional.

Prop. 6.

As the sine of the Complement of the latitude, is to the sine of the latitude, so is the sine of the Declination to the Quotient found: again, as the sine of the Complement of the Declination, is to the whole sine; so is the said Quotient found, to the difference ascensional.

Example.

I would know the difference ascensional, when the Declination is 20 degrees, 6 minutes, and the latitude 51 deg. 40 min. I say,

It	38.28	gives	51.40	what	20.6?
	6203		7844	3437	4346

Facit 4346, for the Quotient found. Then again, I say,

It	61.54	gives	90	what	4346
	9391		10000	4346	4627

Facit 4627, whose Arch in the Table of sines 27 deg. 34 min. is the difference ascensional for the day proposed: the same reduced into hours and minutes, makes one hour and 30 min. which taken from fix a clock, the hour that the Sun riseth, being in the Equinoctial, leaveth four hours, ten min. at what time the Sun then riseth, and the said ascensional difference added to fix a clock, makes

makes seven a clock : fifty minutes for the Suns setting.

Again, the said ascensional difference doubled, and added to 12 hours, the time from 6 in the morning till 6 at night, makes 15 hours, 40 minutes, for the whole length of the day.

This is when the Sun hath North declination, for if the Declination be South, then the ascensional difference added to 12 a clock, gives the Suns rising: and taken from 6, leaves the setting, and being doubled, and taken from 12 heures, leaves the length of the day, as aforesaid.

The Amplitude and difference ascensional of the Sun
or Stars given to find the Declination.

Prop. 7.

As the sine of the time of the Suns rising, converted into degrees and minutes, is to the sine of the complement of the Amplitude, so is the whole sine, to the sine of the complement of the Declination.

Example.

The difference ascensional being 27 deg. 34 min. shews the Sun to rise at 4 a clock 10 minutes, which converted into degrees makes 62 deg. 30 min. and the Amplitude being found as before is shewed in the third proposition, is 33 deg. 38 min. and the complement thereof 56 deg. 24 min. Say then,

If 62.30 give 56.22 what 90?

8870 8326 10000 6 86

Facit 63 86, whose Arch 69 deg. 50 min. the complement thereof 10 degrees 10 minutes is the Declination desired.

The Latitude and Declination given, to find
the Meridional altitude:

Prop. 8.

If the Sun have North declination, add the complement of the Latitude to the Declination, the product is the Peridional Altitude.

Example.

If the Declination be 23 deg. 30 min. North, and the Latitude 51 degrees, 40 minutes, the complement thereof 38 degrees, 20 min. added to 23 deg. 30 min. makes 61 degrees, 50 minutes,

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for the Peridian Altitude: but if the Declination be 23 deg. 30 min. South, and the Latitude 51 degrees 40 min. subtract 23 deg. 30 min. the Declination from 38 deg. 20 minutes, the complement of the Latitude, and the remainder 14 deg. 50 min. is the altitude desired: and if the Sun be in the Equinoctial having no Declination, then is the Peridian Altitude equal to the complement of the Latitude.

The Latitude and Declination known, to find the height of the Sun at any hour of the day.

Prop. 9.

First you are to consider whether the Sun be in Equinoctial, or whether he hath North or South Declination, for if the Sun be in the Equinoctial, then, as the whole sine, is to the sine of the complement of the Latitude, so is the sine of the complement of the Suns distance from noon (allowing 15 deg. for every hour) to the sine of the altitude desired.

Example.

At any part of day the Sun then having no Declination, & Latitude 51 deg. 40 min. I desire the Suns height at 9 a clock before noon, or at 3 afternoon: The complement of the Latitude is 38 deg. 26 min. and the hours distance from noon 45 deg. whole Complement is also 45 deg. Say then,

38	90	give	38.20	what	45	
	10000		6202		7071	4385

Facit 4385, whose Arch 26 deg. is the height of the Sun above the Horizon, at the time and place proposed.

If the Sun have Declination, then is the working somewhat more, except onely at 6 a clock either before or after noon: for which hour, as the whole sine, is to the sine of the Latitude: so is the sine of the Declination, to the sine of the Altitude.

Example.

The Latitude being 51 degrees 40 min. and the Declination 12 deg. 48 min. Say,

38	90	give	55.40	what	11.48	
	10000		7844		2045	1604

Facit 1604, whose arch 9 deg. 14 min. is the Altitude desired.

But

But for any other hour of the day, work as followeth, If it be in the forenoon, subtract the hour given out of 12 hours, and reduce the remainder into degrees, and if the remainder be lesse then 6 hours, seek the sine complement of it, and subtract it out of 10000, & keep the remainder: but if the former remainder be more then 6 hours, subtract 6 hours from it, and keep the sine of the remainder, and add it to 10000, and keep the sum: Then multiply the first remainder kept, or this last sum kept, by the sine of the complement of the Declination, cutting off 4 figures to the right hand from the Product, and multiply the Product by the sine of the complement of the Latitude, cutting off also 4 figures to the right hand from the Product, and this last Product subtract from the sine of the Meridian Altitude of the Sun, and the remainder is the sine of the Suns Altitude required.

You are to note, if the hour given be afternoon, you must take the hour given it self, and observe as before, whether it be more or lesse then 6 hours.

Example.

Any Day or Year, at 9 of the clock, Latitude 51 deg. 30 min. Declination 11 deg. 43 min. South, subtract 9 from 12, the remainder is 3, that being reduced is 45 deg. 0 min. whose sine complement is 7071, which subtracted from 10000, the remainder is 2929, which multiplied by 9791, the sine complement of the Declination 78 deg. 17 min. the Product is 2867, and this Product multiplied by 9223, the sine complement of the Latitude: the last Product is 1784: Now the Meridian Altitude is 50 deg. 13 min. whose sine is 7685, from which subtract the former number, the remainder is 5901, the sine of 36 degrees 9 minutes, the Suns Altitude required.

To find the Suns Azimuth, having the Declination and Altitude of the Sun, and the height of the Pole given.

Prop. 10.

Take the Complement of the Latitude to the Suns Altitude, and from the sine of that summe, subtract the sine of

the Suns Declination, and keep the remainder, when the Sun hath North Declination, but if the Sun have South Declination, add the sine of the Declination, to the sine of that Summe, and keep the whole Summe, which remainder or summe, multiply by the 10000 for the Dividend, and multiply the sine of the Complement of the Suns altitude by the sine of the Complement of the Latitude for the Divisor, cutting off 4 figures to the right hand from the Product, by which Divisor; divide the former Dividend, and if the Quotient be less then 10000, subtract it from 10000, and the remainder is the sine of the Azimuth from the East or West Southwards: but if the Quotient be more then 10000, subtract 10000 from it, and the remainder is the sine of the Azimuth from the East or West Southwards.

Note, if the Sun have no Declination, then the sine of the sum of the Suns Altitude, and the Complement of the Latitude must be multiplied by 10000 for the Dividend, and the Divisor must be as before.

Example.

The Sun having 13 degrees 0 min. North declination in Latitude 51 deg. 30 min. being 42 deg. 0 min. high in the forenoon, Demand the Azimuth. The summe of the Suns altitude, and the complement of the Latitude 81 deg. 30 min. the sine 9890, and the sine of declination 2249, the difference 7644, which multiplied by 10000, for the dividend, is 76440000; the sine of the Complement of the Altitude is 7313, which multiplied by 6125, the sine of the Complement of the Latitude, the Product is 4572 for the divisor; and the Quotient is 16789, from which 10000 subtracted, the remainder is 6789, the sine of 42 deg. 44 min. the Suns Azimuth from the East Southwards.

For the better understanding of this Proposition, take these 3 Cases of Mr. Handsons.

1 For the Suns Azimuth having no Declination.

Add the Complement of the Latitude, to the Complement of the Almicanter. Which if the totall be more then a Quadrant, subtract 90, and set down the Sine of the remainder for

for the first number. Again, add the Complement of the *Latitude*, and the *Almicuter*, and add the Sine thereof to the former, from the one half of that totall subtract your first Number or Sine, and set down the remainder. Then,

As the $\frac{1}{2}$ of the two first numbers added, is in proportion to the whole Sine; so is the said remainder, to the Sine of the Sum true *Azimuth*.

Example.

Latit. $51^{\circ} 30'$ the Complement $38^{\circ} 30'$ Added makes $108^{\circ} 30'$
Almicuter 20° Complement 70° deg. 0' 500 subtract leaves $1830'$
 whose Sine 3173 is the first number. Again, Complement of the *Latitude* $38^{\circ} 30'$ *Almicuter* 20° added, makes $58^{\circ} 30'$ whose Sine 856 is the second number, those two numbers added makes 11699 the $\frac{1}{2}$ thereof 5849 from which subtract 3173 the first number, rests 2676 for the remainder. Then say, 5000 Sine is to 10000, the whole Sine; so is 2676 , the remain, to the *Azimuth* desired.
Facit $45^{\circ} 57'$ Whose Arch $27^{\circ} 17'$ is the *Azimuth* from the East Southward.

2 When the Sun hath North Declination, the two Complements being equal to a Quadrant.

Add the Complement of *Latitude* with the *Almicuter* onely, and from $\frac{1}{2}$ the Sine thereof, subtract the Sine of the Declination, and setting down the remainder

As the $\frac{1}{2}$ aforesaid, is to the whole Sine; so is the remainder aforesaid to the Sine of the *Azimuth* desired.

3 When the Sun hath North Declination, the two Complements less than a Quadrant.

Add the Complement of the *Latitude*, and the Complement of the *Almicuter*, setting down the Sine of the Complement thereof, then add the *Almicuter*, and the complement of the *Latitude*, and from the Sine thereof subtract the former, setting down half

halfe of the remainder for the first found number : Again, subtract the sine of the first Complement from the sine of the Declination; and the remainder thereof : Again, subtract from your first found number, and set the remainder thereof down for your second number; and then,

As the first found, is to the whole sine; so is the second, to the *Azimuth* desired.

4 When the Sun hath North Declination, and the two Complements more then a Quadrant.

A Dde the Complement of the *Latitude*, and complement of the *Almicuter*, which being more then 90, subtract 90, and set down the sine of the remainder, then adde the *Almicuter*, and complement of the *Latitude*, and set down the sine thereof; adde both the sines together, and take the halfe thereof for the first found number; then to the sine of the first two complements, adde the sine of the Declination, and from that total subtract the first found, and set down the remainder for the second found; and then,

As the first found, is to the whole sine; so is the second found, to the sine of the *Azimuth* desired.

5 When the Sun hath South Declination, and the two Complements more then a Quadrant.

A Dde the Complements, subtract 90, set down the sine of the remainder, adde also the *Almicuter*, and complement of *Latitude*, adde both their sines, and set down half of the total for the first found, then subtract the sine of the Declination from the sine of the remainder, of the first two Complements, and that remainder again from the first found, which last remainder set down and say,

As the first found, is to the whole sine; so is the second found, to the sine of the *Azimuth* desired.

In the tenth *Astronomical Proposition* by the *Table of Sines*, y^e have a general rule with some Caution, to finde the *Suns* *Azimuth* newly added.

The *Latitude* given, to find how many Minutes or Miles of the *Equinoctial* makes a degree of *Longitude* in any Parallel.
Prop. 11.

A ll the whole Sine is in proportion to 60, so is the sine of the complement of the *Latitude*, to the miles answerable to a degree in the *Latitude* desired.

I desire to know both in my Miles in running East or West in the latitude of 51 deg. 40 min. what al'ter one degree of Longitude? Say,

If 90 give 60 what 38.20?

10000 60 6100 37

Facit 37 for the number of miles answerable to a degree in the latitude desired.

The Course and distance given, to find out the difference of Latitude.

Prop. 12.

As the whole line is to the miles of way run; so is the sine of the Courses distance from East or West, to the minutes of difference of latitude.

Example.

Running West South-west, which is 22 deg. 30 minutes from the West 75 leagues, or 225 miles; I demand the difference of latitude? Say

If 90 give 225 what 22.30?

10000 225 3827 86

Facit 86 minutes, or one degree 26 minutes, for the difference of latitude upon the said Course and distance.

By Course and Distance given, to find the Difference of Longitude.

Prop. 13.

As the whole line is to the Miles of way that you have run, so is the sine of the degree that your course is distant from South or North, to the miles that you are departed from your first Meridian.

Example.

Running Northwest and by North, which is 33 deg. 45 min. from the North 60 leagues, or 180 miles. I demand the difference of longitude? Say,

If 90 give 180 what 33.45?

10000 180 5556 100

Facit 100 miles, which you are departed from the Meridian to the Westward, which if you divide by the number of miles answerable

able to a degree of Longitude; in the Latitude where you then find your self to be, the Quotient gives you the deg. and min. of the difference of Longitude.

By the distance and departure from the Meridian given,
to find the Course.

Prop. 14.

As the miles of distance that you have run, is in proportion to the whole line; so is the Miles of your departure from the Meridian, to the line of your Course from South or North.

Example.

Being departed from the Ark Persian 75 miles in the running of 50 leagues or 150 miles, I demand upon what point I have sailed; it being betwixt South and West? Say,

If 150 give 10000 what 75? 5000

Facit 5000, whose Arch 30 deg. is the distance from South towards West, that the Course is, which is South-west and by South and Southerly.

The Latitude, declination, and height, of the Sun given,
to know the hour of the day.

Prop. 15.

Subtract the line of the Suns Altitude given out of the line of the Suns Persian Altitude (you may find the Persian Altitude by the eighth Proposition foregoing) and multiply the remainder by 10000 for the Dividend, and multiply the line of the Complement of the Suns Declination by the line of the Complement of the Latitude for the Divisor, by which Divisor divide the former Dividend, and if the Quotient be more then 10000, subtract 10000 from it, and the remainder is the line of the hour wanting of 6 in the Fore-noon, or the hour past 6 in the After-noon; but if the Quotient be less then 10000, subtract it from 10000 and the remainder is the line of the hour past 6 in the Fore-noon, or wanting of 6 in the After-noon.

Example.

Example.

In Latitude 51 deg. 30 min. the Declination 15 deg. 0 min. South, the Altitude 43 de. 0 m. in the forenoon, I demand the hour of the day. The Meridian altitude 53 deg. 30 min. the sine 8038 and the sine of the altitude given 6820, the difference 1218, which multiplied by 10000, is 12180000 for the Dividend, the sine of the Complement of Declination 9659, which multiplied by 6225, the sine of the Complement of the Latitude, the Product is 6012, for the Divisor, and the Quotient is 2025, which subtracted from 10000, the remainder is 7975, the sine of 52 deg. 53 min. the hour past 6 in the Morning, which being reduced, is 3 hours 31 $\frac{1}{2}$ minutes, and added to 6, makes 9 of the clock, and 31 $\frac{1}{2}$ min. the hour of the Day.

To find the *Sinus Versus* of any given Arch.

Prop. 16.

If the Arch given be lesse then 90, subtract it from 90, and the Sine of the remainder taken from the total sine, leaves the Sinus Versus; but if the given Arch be greater then 90 deg. subtract 90 deg. therefrom, and take the Sine of the remainder, which is alwayes the Complement of the given Arch: which Sinus added to the whole Sine, and the total thereof is the Sinus Versus of the given Arch desired.

Example.

To know the Sinus versus of 47 deg. 12 min. the complement thereof is 42 degrees, 48 min. whose sine 6994 taken from 10000, the whole sine, letteth 3206, the reversed sine 47 degrees, 12 minutes.

Alkewise, to know the reversed sine of 137 deg. 25 minutes, which is more then 90 degrees, take 90 therefrom, there letteth 47 deg. 25 minutes, the Sinus whereof 7363 added to the whole Sine, maketh 17363 for the reversed Sine of 137 deg. 25 min.

S

A Table

A Table of Sines.

The Degrees of the Quadrant.

M	0	1	2	3	4	5	6	7	8	9	
1	3	177	352	526	700	874	1048	1222	1395	1567	59
2	6	180	355	529	703	877	1051	1224	1398	1570	58
3	9	183	358	532	706	880	1054	1227	1400	1573	57
4	12	186	361	535	709	883	1057	1230	1403	1576	56
5	14	189	364	538	712	886	1060	123	1406	1579	55
6	17	192	366	542	715	889	1063	1236	1409	1582	54
7	20	195	369	544	718	892	1065	1239	1412	1584	53
8	23	198	372	547	721	895	1068	1242	1415	1587	52
9	26	201	375	549	724	898	1071	1245	1418	1590	51
10	9	204	378	552	726	900	1074	1247	1421	1593	50
11	32	206	381	555	729	903	1077	1250	1424	1596	49
12	35	209	384	558	732	906	1080	1253	1426	1599	48
13	38	212	387	561	735	909	1083	1256	1429	1602	47
14	41	215	390	564	738	912	1086	1259	1432	1605	46
15	44	218	393	567	741	915	1089	1262	1435	1608	45
16	46	221	395	570	744	918	1091	1265	1438	1610	44
17	49	224	398	573	747	921	1094	1268	1441	1613	43
18	52	227	401	576	750	924	1097	1271	1444	1616	42
19	55	230	404	578	753	927	1100	1273	1446	1619	41
20	58	233	407	581	756	930	1103	1276	1449	1622	40
21	61	235	410	584	758	932	1106	1279	1452	1625	39
22	64	238	413	587	761	935	1109	1282	1455	1627	38
23	67	241	416	590	764	938	1112	1285	1458	1630	37
24	70	244	419	593	767	941	1115	1288	1461	1633	36
25	73	247	422	596	770	944	1118	1291	1464	1636	35
26	76	250	425	599	773	947	1120	1294	1467	1639	34
27	78	253	427	602	776	950	1123	1297	1469	1642	33
28	81	256	430	605	779	953	1126	1299	1472	1645	32
29	84	259	433	608	782	956	1129	1302	1475	1648	31
30	87	262	436	610	785	959	1132	1305	1478	1650	30
	89	88	87	86	85	84	83	82	81	80	M

A Table of Sines.

The Degrees of the Quadrant.

M	0	1	2	3	4	5	6	7	8	9	
31	90	265	439	613	737	961	1135	1308	1481	1653	25
32	93	268	442	616	790	964	1138	1311	1484	1656	26
33	96	270	445	619	793	967	1141	1314	1487	1659	27
34	99	273	448	622	796	970	1144	1317	1490	1662	28
35	102	276	451	625	799	973	1146	1320	1492	1665	29
36	105	279	454	628	802	976	1149	1322	1495	1668	30
37	107	282	456	631	805	979	1152	1325	1498	1670	31
38	110	285	460	634	808	982	1155	1328	1501	1673	32
39	113	288	462	637	811	985	1158	1331	1504	1676	33
40	116	291	465	640	814	988	1161	1334	1507	1679	34
41	119	294	468	642	816	990	1164	1337	1510	1682	35
42	122	297	471	645	819	993	1167	1340	1513	1685	36
43	125	300	474	648	822	996	1170	1343	1515	1688	37
44	128	302	477	651	825	999	1172	1346	1518	1691	38
45	131	305	480	654	828	1002	1175	1348	1521	1693	39
46	134	308	483	657	831	1005	1178	1351	1524	1696	40
47	137	311	485	660	834	1008	1181	1354	1527	1699	41
48	140	314	488	663	837	1010	1184	1357	1530	1702	42
49	142	317	491	666	840	1013	1187	1360	1533	1705	43
50	145	320	494	668	843	1016	1190	1363	1536	1708	44
51	148	323	497	671	845	1019	1193	1366	1538	1711	45
52	151	326	500	674	848	1022	1196	1369	1541	1714	46
53	154	329	503	677	851	1025	1198	1372	1544	1716	47
54	157	331	506	680	854	1028	1201	1374	1547	1719	48
55	160	334	509	683	857	1031	1204	1377	1550	1722	49
56	163	337	512	686	860	1034	1207	1380	1553	1725	50
57	166	340	515	689	863	1037	1210	1383	1556	1728	51
58	169	343	517	692	866	1039	1213	1386	1559	1731	52
59	172	347	520	695	869	1042	1216	1389	1561	1734	53
60	174	350	523	697	871	1045	1219	1392	1564	1736	54
	89	88	87	86	85	84	83	82	81	80	M

A Table of Sines.

The Degrees of the Quadrant.

M	10	11	12	13	14	15	16	17	18	19	
1	1739	1911	2082	2252	2422	2591	2759	2926	3093	3258	59
2	1742	1914	2085	2255	2425	2594	2762	2929	3096	3261	58
3	1745	1917	2088	2258	2428	2597	2765	2932	3098	3264	57
4	1748	1919	2090	2261	2430	2599	2767	2935	3101	3267	56
5	1751	1922	2093	2264	2433	2602	2770	2938	3104	3269	55
6	1754	1925	2096	2267	2436	2605	2773	2940	3107	3272	54
7	1757	1928	2099	2269	2439	2608	2776	2943	3109	3275	53
8	1759	1931	2102	2272	2442	2611	2779	2946	3112	3278	52
9	1762	1934	2105	2275	2445	2613	2781	2949	3115	3280	51
10	1765	1937	2107	2278	2447	2616	2784	2951	3118	3283	50
11	1768	1939	2110	2281	2450	2619	2787	2954	3120	3286	49
12	1771	1942	2112	2283	2453	2622	2790	2957	3123	3289	48
13	1773	1945	2117	2286	2456	2625	2793	2960	3126	3291	47
14	1776	1948	2119	2289	2459	2628	2795	2963	3129	3294	46
15	1779	1951	2121	2292	2462	2630	2798	2965	3132	3297	45
16	1782	1954	2125	2295	2464	2633	2801	2968	3134	3300	44
17	1785	1957	2127	2298	2467	2636	2804	2971	3137	3302	43
18	1788	1959	2130	2300	2470	2639	2807	2974	3140	3305	42
19	1790	1962	2133	2303	2473	2641	2809	2976	3143	3308	41
20	1793	1965	2136	2306	2476	2644	2812	2979	3146	3311	40
21	1796	1967	2139	2309	2478	2647	2815	2982	3148	3313	39
22	1799	1971	2142	2312	2481	2650	2818	2985	3151	3316	38
23	1802	1974	2145	2315	2484	2653	2821	2988	3154	3319	37
24	1805	1977	2147	2317	2487	2655	2823	2990	3156	3322	36
25	1808	1979	2150	2320	2490	2658	2826	2993	3159	3324	35
26	1810	1982	2152	2323	2492	2661	2829	2996	3162	3327	34
27	1813	1985	2156	2326	2495	2664	2832	2999	3165	3330	33
28	1816	1988	2159	2329	2498	2667	2835	3001	3167	3332	32
29	1819	1991	2161	2331	2501	2669	2837	3004	3170	3335	31
30	1822	1994	2164	2334	2504	2672	2840	3007	3173	3338	30
79	78	77	76	75	74	73	72	71	70	M	

A Table of Sines.

The degrees of the Quadrant.

M	10	11	12	13	14	15	16	17	18	19	
31	1825	1996	2167	2337	2507	2675	2843	3010	3176	3341	29
32	1828	1999	2170	2340	2509	2678	2846	3013	3178	3343	28
33	1830	2002	2173	2343	2512	2681	2848	3015	3181	3346	27
34	1833	2005	2176	2346	2515	2683	2851	3018	3184	3349	26
35	1836	2008	2178	2349	2518	2686	2854	3021	3187	3352	25
36	1839	2011	2181	2351	2521	2689	2857	3024	3189	3354	24
37	1842	2014	2184	2354	2524	2692	2860	3026	3192	3357	23
38	1846	2016	2187	2357	2526	2695	2862	3029	3195	3360	22
39	1848	2019	2190	2360	2529	2698	2865	3032	3198	3363	21
40	1850	2022	2193	2363	2532	2700	2868	3035	3201	3365	20
41	1853	2025	2196	2365	2535	2703	2871	3037	3203	3368	19
42	1856	2028	2198	2368	2538	2706	2874	3040	3206	3371	18
43	1859	2031	2201	2371	2540	2709	2876	3043	3209	3374	17
44	1862	2034	2204	2374	2543	2712	2879	3046	3212	3376	16
45	1865	2036	2207	2377	2546	2714	2882	3049	3214	3379	15
46	1868	2039	2210	2380	2549	2717	2885	3051	3217	3382	14
47	1870	2042	2213	2382	2552	2720	2887	3054	3220	3385	13
48	1873	2045	2216	2385	2555	2723	2890	3057	3223	3387	12
49	1876	2048	2218	2388	2557	2726	2893	3060	3225	3390	11
50	1879	2051	2221	2391	2560	2728	2896	3062	3228	3393	10
51	1882	2053	2224	2394	2563	2731	2899	3065	3231	3396	9
52	1885	2056	2227	2397	2566	2734	2901	3068	3234	3398	8
53	1888	2059	2230	2399	2568	2737	2904	3071	3236	3401	7
54	1890	2062	2232	2402	2571	2740	2907	3073	3239	3404	6
55	1894	2065	2235	2405	2574	2743	2910	3076	3242	3406	5
56	1896	2068	2238	2406	2577	2745	2913	3079	3245	3409	4
57	1899	2070	2241	2411	2580	2748	2915	3082	3248	3412	3
58	1902	2073	2244	2414	2583	2751	2918	3085	3250	3415	2
59	1905	2076	2247	2416	2585	2754	2921	3087	3253	3417	1
60	1908	2079	2249	2419	2588	2756	2924	3090	3256	3420	0
79	78	77	76	75	74	73	72	71	70	M	

A Table of Sines.

The Degrees of the Quadrant.

M	20	21	22	23	24	25	26	27	28	29	
1	3425	3586	3748	3910	4070	4229	4386	4541	4697	4851	59
2	3426	3589	3751	3913	4073	4231	4389	4545	4700	4853	58
3	3428	3592	3754	3915	4075	4234	4391	4548	4702	4856	57
4	3431	3594	3757	3918	4078	4236	4394	4550	4705	4858	56
5	3434	3597	3759	3921	4081	4239	4396	4553	4707	4861	55
6	3437	3600	3762	3923	4083	4242	4399	4555	4710	4863	54
7	3439	3603	3765	3926	4086	4245	4402	4558	4713	4866	53
8	3442	3605	3768	3929	4089	4247	4404	4561	4715	4868	52
9	3445	3608	3770	3931	4091	4250	4407	4563	4718	4871	51
10	3447	3611	3773	3934	4094	4252	4410	4566	4720	4873	50
11	3450	3613	3776	3937	4096	4255	4412	4568	4723	4876	49
12	3453	3616	3778	3939	4099	4258	4415	4571	4725	4878	48
13	3456	3619	3781	3942	4102	4260	4418	4573	4728	4881	47
14	3458	3622	3784	3945	4104	4263	4420	4576	4731	4883	46
15	3461	3624	3786	3947	4107	4266	4423	4579	4733	4886	45
16	3464	3627	3789	3950	4110	4268	4425	4581	4736	4888	44
17	3467	3630	3792	3953	4112	4271	4428	4584	4738	4891	43
18	3469	3632	3794	3955	4115	4274	4431	4586	4741	4893	42
19	3472	3635	3797	3958	4118	4276	4433	4589	4743	4896	41
20	3475	3638	3800	3961	4120	4279	4436	4592	4746	4898	40
21	3477	3641	3803	3963	4123	4281	4438	4594	4748	4901	39
22	3480	3643	3805	3966	4126	4284	4441	4597	4751	4904	38
23	3483	3646	3808	3969	4128	4287	4444	4599	4754	4906	37
24	3486	3649	3811	3971	4131	4289	4446	4602	4756	4909	36
25	3488	3651	3813	3974	4134	4292	4449	4604	4759	4911	35
26	3491	3654	3816	3977	4136	4295	4451	4607	4761	4914	34
27	3494	3657	3819	3979	4139	4297	4454	4610	4764	4916	33
28	3497	3660	3821	3982	4142	4300	4457	4612	4766	4919	32
29	3499	3662	3824	3985	4144	4302	4459	4615	4769	4921	31
30	3502	3665	3827	3987	4147	4305	4462	4617	4771	4924	30
	69	68	67	66	65	64	63	62	61	60	M

A Table of Sines.

The degrees of the Quadrant.

M	20	21	22	23	24	25	26	27	28	29
31	3503	3668	3829	3990	4149	4308	4464	4620	4774	4927 29
32	3507	3670	3832	3993	4152	4310	4467	4623	4777	4929 28
33	3510	3673	3835	3995	4155	4313	4470	4625	4779	4932 27
34	3513	3676	3838	3998	4157	4316	4472	4628	4782	4934 26
35	3516	3679	3840	4001	4160	4318	4475	4630	4784	4937 25
36	3518	3681	3843	4003	4163	4321	4478	4633	4787	4939 24
37	3521	3684	3846	4006	4165	4324	4480	4635	4789	942 23
38	3524	3687	3848	4009	4168	4326	4483	4638	4792	4944 22
39	3527	3689	3851	4012	4171	4329	4485	4641	4794	4947 21
40	3529	3692	3854	4014	4173	4331	4488	4643	4797	949 20
41	3532	3695	3856	4017	4176	4334	4490	4646	4799	4952 19
42	3535	3697	3859	4019	4178	4336	4493	4648	4802	4954 18
43	3537	3700	3862	4022	4181	4339	4496	4651	4805	4957 17
44	3540	3703	3864	4025	4184	4342	4498	4653	4807	4960 16
45	3543	3706	3867	4028	4186	4344	4501	4656	4810	4962 15
46	3546	3708	3870	4030	4189	4347	4503	4659	4812	4965 14
47	3548	3711	3872	4033	4192	4350	4506	4661	4815	4967 13
48	3551	3714	3875	4035	4194	4352	4509	4664	4817	4970 12
49	3554	3716	3878	4038	4197	4355	4511	4666	4820	4972 11
50	3556	3719	3880	4041	4200	4357	4514	4669	4822	4975 10
51	3559	3722	3883	4043	4202	4360	4516	4671	4825	4977 9
52	3562	3724	3886	4046	4205	4363	4519	4674	4828	4980 8
53	3565	3727	3888	4049	4208	4365	4522	4677	4830	4982 7
54	3567	3730	3891	4051	4210	4368	4524	4679	4833	4985 6
55	3570	3732	3894	4054	4213	4371	4527	4682	4835	4987 5
56	3573	3735	3896	4057	4216	4373	4529	4684	4838	4990 4
57	3575	3738	3899	4059	4218	4376	4532	4687	4840	4992 3
58	3578	3741	3902	4062	4221	4378	4535	4689	4843	4995 2
59	3581	3743	3905	4065	4224	4381	4537	4692	4844	4997 1
60	3584	3746	3908	4067	4226	4384	4540	4695	4848	5000
	69	68	67	66	65	64	63	62	61	60

A Table of Sines.

The Degrees of the Quadrant.

M	30	31	32	33	34	35	36	37	
1	5002	5153	5302	5449	5594	5738	5880	6020	59
2	5005	5155	5304	5451	5597	5740	5882	6023	58
3	5007	5158	5306	5454	5599	5743	5885	6025	57
4	5010	5160	5309	5456	5601	5745	5887	6027	56
5	5012	5163	5311	5458	5604	5748	5890	6030	55
6	5015	5165	5314	5461	5606	5750	5892	6032	54
7	5017	5168	5316	5463	5609	5752	5894	6034	53
8	5020	5170	5319	5466	5611	5755	5896	6037	52
9	5022	5173	5321	5468	5614	5757	5899	6039	51
10	5025	5175	5324	5471	5616	5759	5901	6041	50
11	5027	5178	5326	5473	5618	5762	5904	6044	49
12	5030	5180	5329	5476	5621	5764	5906	6046	48
13	5032	5183	5331	5478	5623	5767	5909	6048	47
14	5035	5185	5334	5480	5625	5769	5911	6051	46
15	5038	5188	5336	5483	5628	5771	5913	6053	45
16	5040	5190	5339	5485	5630	5774	5915	6055	44
17	5042	5193	5341	5488	5633	5776	5918	6057	43
18	5045	5195	5343	5490	5635	5778	5920	6060	42
19	5048	5198	5346	5493	5638	5781	5922	6062	41
20	5050	5200	5348	5495	5640	5783	5925	6064	40
21	5053	5203	5351	5497	5642	5785	5927	6067	39
22	5055	5205	5353	5500	5645	5788	5929	6069	38
23	5058	5208	5356	5502	5647	5790	5932	6071	37
24	5060	5210	5358	5505	5650	5793	5934	6074	36
25	5063	5214	5361	5507	5652	5795	5936	6076	35
26	5065	5215	5363	5509	5654	5797	5939	6078	34
27	5068	5217	5366	5512	5657	5800	5941	6081	33
28	5070	5220	5368	5514	5659	5802	5943	6083	32
29	5073	5221	5370	5517	5662	5805	5946	6085	31
30	5075	5225	5373	5519	5664	5807	5948	6088	30
	59	58	57	56	55	54	53	52	M

A Table of Sines.

The Degrees of the Quadrant.

M	30	31	32	33	34	35	36	37	
31	5073	5227	5375	5522	5666	5809	5950	6090	29
32	5080	5230	5378	5524	5669	5812	5953	6092	28
33	5083	5232	5380	5527	5671	5814	5955	6094	27
34	5085	5235	5383	5529	5674	5816	5957	6097	26
35	5088	5237	5385	5531	5676	5819	5960	6099	25
36	5090	5240	5388	5534	5678	5821	5962	6101	24
37	5093	5242	5390	5536	5681	5823	5964	6104	23
38	5095	5245	5393	5539	5683	5826	5967	6106	22
39	5098	5247	5395	5541	5685	5828	5969	6108	21
40	5100	5250	5397	5543	5688	5831	5971	6111	20
41	5103	5252	5400	5546	5690	5833	5975	6114	19
42	5105	5255	5402	5548	5693	5835	5978	6117	18
43	5108	5257	5404	5551	5695	5838	5980	6119	17
44	5110	5260	5407	5553	5697	5840	5982	6121	16
45	5113	5262	5410	5556	5700	5842	5985	6123	15
46	5115	5265	5412	5558	5702	5845	5986	6124	14
47	5118	5267	5415	5560	5705	5847	5988	6127	13
48	5120	5269	5417	5563	5707	5849	5990	6129	12
49	5123	5272	5419	5565	5709	5852	5992	6131	11
50	5127	5274	5422	5568	5712	5854	5995	6134	10
51	5128	5277	5424	5570	5714	5856	5997	6136	9
52	5130	5279	5427	5573	5717	5859	5999	6138	8
53	5133	5282	5429	5575	5719	5861	6002	6140	7
54	5135	5284	5431	5577	5721	5864	6004	6142	6
55	5138	5287	5434	5580	5724	5866	6006	6145	5
56	5140	5289	5437	5582	5726	5868	6009	6147	4
57	5143	5292	5439	5585	5729	5871	6011	6149	3
58	5145	5294	5441	5587	5731	5873	6013	6151	2
59	5148	5297	5444	5589	5733	5875	6016	6154	1
60	5150	5299	5446	5592	5736	5878	6018	6156	0
	59	58	57	56	55	54	53	52	M

A Table of Sines.

The Degrees of the Quadrant.

M	38	39	40	41	42	43	44	45	
1	6159	6295	6430	6563	6694	6822	6949	7073	59
2	6161	6298	6432	6565	6696	6824	6951	7075	58
3	6163	6300	6434	6567	6698	6826	6953	7077	57
4	6166	6302	6437	6569	6700	6828	6955	7079	56
5	6168	6304	6439	6571	6702	6831	6957	7081	55
6	6170	6307	6441	6574	6704	6833	6959	7083	54
7	6173	6309	6443	6576	6706	6835	6961	7085	53
8	6175	6311	6446	6578	6708	6837	6963	7087	52
9	6177	6313	6448	6580	6711	6839	6965	7089	51
10	6179	6316	6450	6583	6713	6841	6967	7092	50
11	6182	6318	6452	6585	6715	6843	6969	7094	49
12	6184	6320	6454	6587	6717	6845	6972	7096	48
13	6186	6322	6457	6589	6719	6848	6974	7098	47
14	6189	6325	6459	6561	6721	6850	6976	7100	46
15	6191	6327	6461	6593	6724	6852	6978	7102	45
16	6193	6329	6463	6596	6726	6854	6980	7104	44
17	6195	6331	6466	6598	6728	6856	6982	7106	43
18	6198	6334	6468	6600	6730	6858	6984	7108	42
19	6200	6336	6470	6602	6732	6860	6986	7110	41
20	6202	6338	6472	6604	6734	6862	6988	7112	40
21	6205	6340	6474	6606	6736	6864	6990	7114	39
22	6207	6344	6477	6609	6738	6867	6992	7116	38
23	6209	6345	6479	6611	6741	6869	6994	7118	37
24	6211	6347	6481	6613	6743	6871	6997	7120	36
25	6213	6349	6483	6615	6745	6874	6999	7122	35
26	6216	6352	6486	6617	6747	6875	7001	7124	34
27	6218	6354	6488	6619	6749	6877	7003	7126	33
28	6220	6356	6490	6622	6752	6879	7005	7128	32
29	6223	6358	6492	6624	6754	6881	7007	7130	31
30	6225	6361	6494	6626	6756	6883	7009	7132	30
	51	50	49	48	47	46	45	44	M

A Table of Sines.

The Degrees of the Quadrant.

M	38	39	40	41	42	43	44	45	
31	6227	6363	6497	6628	6758	6886	7011	7134	29
32	6230	6365	6499	6630	6760	6888	7013	7136	28
33	6232	6367	6501	6633	6762	6890	7015	7139	27
34	6234	6370	6503	6635	6764	6892	7017	7141	26
35	6236	6372	6505	6637	6766	6894	7019	7143	25
36	6239	6374	6508	6639	6769	6896	7021	7145	24
37	6241	6376	6510	6641	6771	6898	7023	7147	23
38	6243	6379	6512	6644	6773	6900	7026	7149	22
39	6245	6381	6514	6646	6775	6902	7028	7151	21
40	6248	6383	6516	6648	6777	6905	7030	7153	20
41	6250	6385	6519	6650	6779	6907	7032	7155	19
42	6252	6387	6521	6652	6781	6909	7034	7157	18
43	6255	6390	6523	6654	6783	6911	7036	7159	17
44	6257	6392	6525	6657	6786	6913	7038	7161	16
45	6259	6394	6527	6659	6788	6915	7040	7163	15
46	6261	6396	6530	6661	6790	6917	7042	7165	14
47	6264	6399	6532	6663	6792	6919	7044	7167	13
48	6266	6401	6534	6665	6794	6921	7046	7169	12
49	6268	6403	6536	6667	6796	6923	7048	7171	11
50	6270	6405	6539	6670	6799	6925	7050	7173	10
51	6273	6408	6541	6672	6801	6928	7052	7175	9
52	6275	6410	6543	6674	6803	6930	7054	7177	8
53	6277	6412	6545	6676	6805	6932	7057	7179	7
54	6279	6414	6547	6678	6807	6934	7059	7181	6
55	6282	6417	6550	6680	6809	6936	7061	7183	5
56	6284	6419	6552	6683	6811	6938	7063	7185	4
57	6286	6421	6554	6685	6813	6940	7065	7187	3
58	6289	6423	6556	6687	6816	6942	7067	7189	2
59	6291	6426	6558	6689	6818	6944	7069	7191	1
60	6293	6428	6560	6691	6820	6946	7071	7193	0
	51	50	49	58	47	46	45	44	M

A Table of Sines.

The Degrees of the Quadrant.

M	46	47	48	49	50	51	52	53	
1	7195	7315	7433	7549	7662	7773	7882	7988	59
2	7197	7317	7435	7551	7664	7775	7884	7990	58
3	7199	7319	7437	7553	7666	7777	7885	7992	57
4	7201	7321	7439	7555	7668	7779	7887	7993	56
5	7203	7323	7441	7557	7670	7781	7889	7995	55
6	7205	7325	7443	7559	7672	7782	7891	7997	54
7	7207	7327	7445	7560	7673	7784	7893	7998	53
8	7209	7329	7447	7562	7675	7786	7894	8000	52
9	7211	7331	7449	7564	7677	7788	7896	8002	51
10	7213	7333	7451	7566	7679	7790	7898	8004	50
11	7215	7335	7453	7568	7681	7791	7899	8005	49
12	7218	7337	7455	7570	7683	7793	7901	8007	48
13	7220	7339	7457	7572	7685	7795	7903	8009	47
14	7222	7341	7459	7574	7687	7797	7905	8011	46
15	7224	7343	7461	7576	7688	7799	7907	8012	45
16	7226	7345	7463	7577	7690	7801	7909	8014	44
17	7228	7347	7464	7579	7692	7803	7910	8016	43
18	7230	7349	7466	7581	7694	7804	7912	8018	42
19	7232	7351	7468	7583	7696	7806	7914	8019	41
20	7234	7353	7470	7585	7698	7808	7916	8021	40
21	7236	7355	7472	7587	7700	7810	7918	8023	39
22	7238	7357	7474	7589	7701	7811	7919	8025	38
23	7240	7359	7476	7591	7703	7813	7921	8026	37
24	7242	7361	7478	7593	7705	7815	7923	8028	36
25	7244	7363	7480	7595	7707	7817	7925	8030	35
26	7246	7365	7482	7596	7709	7819	7926	8032	34
27	7248	7367	7484	7598	7711	7821	7928	8033	33
28	7250	7369	7486	7600	7712	7822	7930	8035	32
29	7252	7371	7488	7602	7714	7824	7932	8037	31
30	7254	7373	7490	7604	7716	7826	7933	8038	30
	43	42	41	40	39	38	37	36	M

A Table of Sines.

The degrees of the Quadrant.

M	46	47	48	49	50	51	52	53	
31	7256	7375	7491	7606	7718	7828	7935	8040	29
32	7258	7377	7492	7608	7720	7830	7937	8042	28
33	7260	7379	7495	7610	7722	7832	7939	8044	27
34	7262	7381	7497	7612	7724	7833	7941	8045	26
35	7264	7382	7499	7614	7725	7835	7942	8047	25
36	7266	7384	7501	7615	7727	7837	7944	8049	24
37	7268	7386	7503	7617	7729	7839	7946	8051	23
38	7270	7388	7505	7619	7731	7840	7948	8052	22
39	7272	7390	7507	7621	7733	7842	7949	8054	21
40	7274	7392	7509	7622	7735	7844	7951	8056	20
41	7276	7394	7511	7625	7737	7846	7953	8058	19
42	7278	7396	7513	7627	7739	7848	7955	8059	18
43	7280	7398	7514	7629	7740	7849	7956	8061	17
44	7282	7400	7516	7630	7742	7851	7958	8063	16
45	7284	7402	7518	7632	7744	7853	7960	8064	15
46	7286	7404	7520	7634	7746	7855	7962	8066	14
47	7288	7406	7522	7636	7748	7857	7963	8068	13
48	7290	7408	7524	7638	7750	7858	7965	8070	12
49	7292	7410	7526	7640	7751	7860	7967	8071	11
50	7294	7412	7528	7642	7753	7862	7969	8073	10
51	7296	7414	7530	7644	7755	7864	7970	8075	9
52	7298	7416	7532	7645	7757	7866	7972	8076	8
53	7300	7418	7534	7647	7759	7867	7974	8078	7
54	7301	7420	7536	7649	7760	7869	7976	8080	6
55	7303	7422	7537	7651	7762	7871	7977	8082	5
56	7305	7424	7539	7653	7764	7873	7979	8083	4
57	7307	7426	7541	7655	7766	7875	7981	8085	3
58	7309	7428	7543	7657	7768	7876	7983	8087	2
59	7311	7429	7545	7658	7770	7878	7985	8088	1
60	7313	7431	7547	7660	7771	7880	7986	8090	0
	43	42	41	40	39	38	37	36	M

A Table of Sines.

The Degrees of the Quadrant.

M	54	55	56	57	58	59	60	
1	8092	8193	8292	8388	8482	8573	8662	59
2	8094	8195	8294	8390	8483	8575	8663	58
3	8095	8197	8295	8391	8485	8576	8665	57
4	8097	8198	8297	8393	8487	8578	8666	56
5	8099	8200	8298	8395	8489	8579	8668	55
6	8100	8201	8300	8396	8490	8581	8669	54
7	8102	8203	8302	8398	8491	8582	8670	53
8	8104	8205	8304	8399	8493	8584	8672	52
9	8105	8206	8305	8401	8494	8585	8673	51
10	8107	8208	8307	8402	8496	8587	8675	50
11	8109	8210	8308	8404	8497	8588	8676	49
12	8111	8212	8310	8406	8499	8590	8678	48
13	8112	8213	8311	8407	8500	8591	8679	47
14	8114	8215	8313	8409	8502	8593	8681	46
15	8116	8216	8315	8410	8503	8594	8682	45
16	8117	8218	8316	8412	8504	8596	8684	44
17	8119	8220	8318	8414	8506	8597	8685	43
18	8121	8221	8319	8415	8507	8599	8687	42
19	8122	8223	8321	8417	8509	8600	8688	41
20	8124	8225	8323	8418	8511	8602	8690	40
21	8126	8226	8324	8420	8513	8603	8691	39
22	8128	8228	8326	8421	8514	8605	8692	38
23	8129	8230	8328	8423	8516	8606	8694	37
24	8131	8231	8329	8424	8517	8607	8695	36
25	8133	8233	8331	8426	8519	8608	8697	35
26	8134	8235	8332	8428	8520	8610	8698	34
27	8136	8236	8334	8429	8522	8612	8699	33
28	8138	8238	8336	8431	8523	8613	8701	32
29	8139	8240	8337	8432	8525	8615	8702	31
30	8141	8241	8339	8434	8526	8616	8704	30
	35	34	33	32	31	30	29	M

A Table of Sines.

The degrees of the Quadrant.

M	54	55	56	57	58	59	60	
31	8143	8243	8340	8435	8528	8618	8705	29
32	8144	8245	8342	8437	8529	8619	8706	28
33	8146	8246	8344	8438	8531	8621	8708	27
34	8148	8248	8346	8440	8532	8622	8709	26
35	8149	8249	8347	8442	8533	8623	8711	25
36	8151	8251	8348	8443	8536	8625	8712	24
37	8153	8253	8350	8445	8537	8627	8713	23
38	8155	8254	8352	8446	8539	8629	8715	22
39	8156	8256	8353	8448	8540	8630	8716	21
40	8158	8257	8355	8449	8541	8632	8718	20
41	8160	8259	8356	8451	8543	8633	8719	19
42	8161	8261	8358	8452	8545	8634	8720	18
43	8163	8263	8360	8454	8546	8636	8722	17
44	8165	8264	8361	8455	8548	8637	8724	16
45	8166	8266	8362	8457	8549	8638	8725	15
46	8168	8267	8364	8458	8551	8640	8726	14
47	8170	8269	8366	8460	8552	8641	8728	13
48	8171	8271	8367	8462	8554	8643	8729	12
49	8172	8272	8369	8463	8555	8644	8731	11
50	8174	8274	8371	8465	8557	8646	8732	10
51	8176	8276	8372	8466	8558	8647	8733	9
52	8178	8277	8374	8468	8560	8648	8735	8
53	8180	8279	8375	8470	8561	8650	8736	7
54	8181	8281	8377	8471	8563	8651	8738	6
55	8183	8282	8379	8473	8565	8653	8739	5
56	8185	8284	8380	8474	8566	8655	8740	4
57	8186	8285	8382	8476	8567	8656	8742	3
58	8188	8287	8383	8477	8568	8657	8743	2
59	8190	8289	8385	8479	8570	8659	8745	1
60	8191	8290	8387	8480	8572	8660	8746	0
	35	34	33	32	31	30	29	M

A Table of Sines.

The Degrees of the Quadrant.

M	61	62	63	64	65	66	67	
1	8749	8832	8913	8990	9065	9138	9207	59
2	8752	8835	8915	8993	9068	9140	9209	58
3	8755	8838	8918	8995	9070	9142	9212	57
4	8758	8841	8921	8998	9073	9145	9214	56
5	8760	8843	8923	9000	9075	9147	9216	55
6	8763	8846	8926	9003	9078	9149	9218	54
7	8766	8849	8928	9006	9080	9152	9221	53
8	8769	8852	8931	9008	9083	9154	9223	52
9	8771	8854	8934	9011	9085	9156	9225	51
10	8774	8857	8936	9013	9087	9159	9228	50
11	8777	8860	8939	9016	9090	9161	9230	49
12	8780	8862	8941	9018	9092	9164	9232	48
13	8783	8865	8944	9021	9095	9166	9234	47
14	8785	8867	8947	9023	9098	9168	9236	46
15	8788	8870	8949	9026	9100	9171	9239	45
16	8791	8873	8952	9028	9102	9173	9241	44
17	8794	8875	8954	9031	9104	9175	9243	43
18	8796	8878	8957	9033	9107	9177	9245	42
19	8799	8880	8960	9036	9109	9180	9247	41
20	8802	8883	8962	9038	9111	9182	9250	40
21	8805	8886	8965	9041	9114	9184	9252	39
22	8808	8889	8967	9043	9116	9187	9254	38
23	8810	8891	8970	9046	9119	9189	9256	37
24	8813	8894	8972	9048	9121	9191	9259	36
25	8816	8897	8975	9051	9123	9194	9261	35
26	8819	8899	8978	9054	9126	9196	9263	34
27	8821	8902	8980	9056	9128	9198	9265	33
28	8824	8905	8983	9058	9131	9200	9267	32
29	8827	8907	8985	9061	9133	9203	9270	31
30	8830	8910	8988	9063	9135	9205	9272	30
—	28	27	26	25	24	23	22	M

A Table of Sines.

The Degrees of the Quadrant.

M	68	69	70	71	72	73	74	
2	9272	9338	9399	9457	9512	9565	9614	58
4	9216	9330	9401	9459	9514	9566	9616	56
6	9278	9342	9403	9461	9516	9568	9617	54
8	9280	9344	9405	9463	9518	9570	9619	52
10	9283	9346	9407	9465	9519	9571	9620	50
12	9285	9348	9409	9466	9521	9573	9622	48
14	9287	9351	9411	9468	9523	9575	9624	46
16	9289	9352	9413	9470	9525	9576	9625	44
18	9291	9354	9415	9472	9527	9578	9627	42
20	9293	9356	9417	9474	9528	9580	9628	40
22	9296	9358	9419	9476	9530	9581	9630	38
24	9298	9360	9420	9478	9532	9583	9632	36
26	6300	9363	9422	9480	9534	9585	9633	34
28	6302	9365	9424	9481	9535	9586	9635	32
30	9304	9367	9426	9483	9537	9588	9636	30
32	9306	9369	9428	9485	9539	9590	9638	28
34	9308	9371	9430	9487	9540	9591	9639	26
36	9310	9373	9432	9489	9542	9593	9641	24
38	9313	9375	9434	9491	9544	9595	9642	22
40	9315	9377	9436	9492	9546	9596	9644	20
42	9317	9380	9438	9494	9548	9598	9645	18
44	9319	9381	9440	9496	9549	9600	9647	16
46	9321	9383	9442	9498	9551	9601	9648	14
48	9323	9385	9444	9500	9553	9602	9650	12
50	9325	9387	9446	9501	9554	9604	9651	10
52	9327	9389	9447	9503	9556	9606	9653	8
54	9329	9391	9449	9505	9558	9608	9655	6
56	9332	9393	9451	9507	9559	9609	9656	4
58	9334	9395	9453	9509	9561	9611	9658	2
60	9336	9397	9455	9510	9563	9613	9659	0
	21	20	19	18	17	16	15	M

A Table of Sines.

The Degrees of the Quadrant.

M	75	76	77	78	79	80	81	82	
5	9663	9706	9747	9784	9819	9850	9879	9905	55
10	9667	9710	9750	9787	9822	9853	9881	9907	50
15	9670	9713	9753	9790	9824	9855	9884	9909	45
20	9674	9717	9756	9793	9827	9858	9886	9911	40
25	9678	9720	9760	9796	9830	9860	9888	9913	35
30	9681	9724	9763	9799	9832	9863	9890	9914	30
35	9685	9727	9766	9802	9835	9865	9892	9916	25
40	9689	9730	9769	9805	9838	9868	9894	9918	20
45	9692	9734	9772	9808	9840	9870	9896	9920	15
50	9696	9737	9775	9811	9843	9872	9898	9921	10
55	9699	9748	9778	9813	9846	9874	9900	9924	5
60	9703	9754	9781	9816	9848	9877	9903	9925	0
	14	13	12	11	10	9	8	7	M

The Degrees of the Quadrant.

M	83	84	85	86	87	88	89	
5	9927	9947	9963	9977	9987	9994	9998	55
10	9929	9948	9964	9978	9988	9995	9998	50
15	9931	9950	9965	9978	9988	9995	9999	45
20	9932	9951	9967	9979	9989	9996	9999	40
25	9934	9952	9968	9980	9990	9996	9999	35
30	9936	9954	9969	9981	9990	9996	9999	30
35	9937	9955	9970	9982	9991	9997	9999	25
40	9939	9957	9971	9983	9992	9997	9999	20
45	9940	9958	9972	9984	9992	9998	9999	15
50	9942	9959	9973	9984	9993	9998	10000	10
55	9944	9960	9975	9985	9993	9998	10000	5
60	9945	9962	9976	9985	9994	9998	10000	0
	6	5	4	3	2	1	0	M

The Extraction of Roots.

It is not unnecessary, before we do enter into this order and method of teaching how to extract a Root, to shew the others kinds and their definitions: Therefore you must know that of Roots there are sundry sorts, according to the quantittes from which they are deriued, as the Squares, Cubes, Squared Squares, Surdsolids, &c. for the numbers receiue their names of the said quantittes, every quantity having his Root, which may be called the first quantity. Because it is the side or beginning of the quantity whereunto it is set: Numbers of the second quantity are called Squares; of the third, Cubes; of the fourth Squared Squares, as before, wherein you may proceed infinitely if you will; but you shall seldome or neuer have use for the extraction of the Root of any quantity more then Squares and Cubes. A Square number is the Product of any number multiplied in it self, and the Root thereof is the multiplier, whereby the same square number is produced: As for example, 4 is a square number. coming of the multiplication of 2 in it self, which is the Root thereof.

A Cubick number is the product of a number multiplied into it self, and the same Product multiplied again by the first number: As 2 multiplied by it self is 4, that Product multiplied again by 2, the first number, makes 8, which is a Cubick number, and the Root thereof.

A Squared Square number is produced of 3 multiplications, first any number by it self, makes a Square number, that Product again by the first Root or multiplier, makes a cubick number: and lastly, that Product again by the first figure or Root, produceth a Squared Square number, as 2 multiplied in it self makes 4 a square number, that again by 2, makes 8, which is a cubick number, and then that product again by 2, produceth 16, which is a Squared square number, and the root thereof is 2. A Surdsolid number is the product of a number multiplied four times by the root thereof: as 2 is a Surdsolid number, the Root whereof is 2: for 2 multiplied in it self is 4, that multiplied again by 2 is 8, the same product again by 2, makes 16; and lastly, the same Product multiplied by the first number 2, makes 32. Therefore A

conclude that 32 is a Surdfolid number, and the number 2, where-
by the said number is produced, is the Surdfolid root to the said
number: and this multiplying the last product by the first num-
ber, or Root you may proceed infinitely, but more then these are
needlesse, and as I said before, without any great or common
use.

Now for the finding of the root it must be done according to the
quantity whereof it taketh denomination, as whether it be of a
Square, or Cube, or otherwise: which known, let us proceed to
the working thereof.

You must understand that the order of extracting the Root of
any quantity, is not much unlike to Division differing onely in
this, that whereas in Division the Divisor is known, but here it
is to find: also in Division you alwayes keep one Divisor, but in
this you must change your Divisor at each removing, which is
at the finding of every figure contained in the Root. Now there-
fore I will lay down one general way for the Extraction of the
root of all quantities whatsoever, which is done by certain num-
bers applyed to each severall quantity, which are these: For the
Square root in one number required, which is 20. For the Cube
two numbers, which are 300 and 30. For the Squared Square
three numbers, viz. 4000, 600, and 40.

Thus having declared the kinds, numbers, quantities, and or-
der of the Extraction of all sorts of Roots, it followeth that we
proceed to the practice thereof: And first, to extract the Square root
of any number, you must consider as before I have said, that 20
is the number for the same quantity: Also you must learn by
memoz the full square of all the 9 Unities, which if you know
not, this Table will stand you in some stead: where you see
that against every of the 9 Unities aforesaid towards the
right hand is the square of that unity against which it doth
stand: which known, set down the number whereof you
would extract the square root, then under the last figure at
the right hand put a prick, and then proceeding towards
the left hand, under every second figure put a prick, & done,
as to with your pen a quotient, as in Division: Now for
to find the root of your given number, set the greatest
square

Square number contained in the number over the first pitch, that
 square number take from the number over the said first pitch,
 and set the remainder over it, the root of which square number put
 in the quotient for the figure of the root; that root multiply by 20,
 the number for the square root, and then look how often the Pro-
 duct thereof may be taken from the number over, or to the left hand
 of the second pitch, which put in your quotient for the second fi-
 gure of the root; but this is to be noted for a general rule, that
 you must take no greater number for your second figure then that
 the square thereof added with the former product may be taken
 from the number over the said second pitch, and also look how
 many pitches are under your given number, so many figures
 must be in the quotient for the root of the said number: then ha-
 ving found two figures in the quotient, if there be any more pitches
 multiply the whole number in the quotient by 20, and seek how
 often the Product thereof may be taken from the number over or
 belonging to the next pitch, which number put in the quotient,
 and adding the square thereof to the former product, subtract the
 whole sum from the number over the said pitch, & cancelling the
 said number, as at each remove you must do, set the remainder o-
 ver it, and if there be any more pitches undone, so as you did be-
 fore, alwayes multiplying the quotient by 20, thereto adding the
 square of the last figure, and the total sum being subtracted from
 the last remainder, if there tells nothing, it is a square number; or
 else not; which you may prove, if you multiply the root by it self
 squarely, for the root being truly extracted will produce the first
 given number. But because that Examples are easiest for the
 understanding: let 104976 be the given number, whereof I would
 know the square root, viz. what number being multiplied in it self
 will produce the aforesaid number of 104976. Therefore, first, I
 set down the said number, and under the last figure towards the
 right hand, which in this example is 6, I put a pitch or point; a-
 nother under the 9, and lastly, another under 0, leaving one figure
 betwixt every pitch: which done, and the quotient
 drawn, the given number will stand thus: where- 104976
 by I see that the Root of the said number must
 consist of 3 figures, because it hath 3 pitches under it; then I seek

the.

the greatest square number is 10, it being the number belonging to the first pick toward the left hand, that I find to be 9, which is produced of 3 multiplied squarely, therefore I put 3 in the quotient for the first figure of the root, and the square thereof being 9, I subtract from 10, the number over the first pick, & there rest 1. The order of which work will stand thus: 1

where you see that the figures over the first prick
is cancelled, there is 3 in the quotient for the first
figure of the Root, and rests, which with the fi-
gures betwixt it and the next prick, makes 149 for the number
of the second prick. So for the second figure of the root, I mul-
tiply the root already found by 20, and the product is 60, that I
seek how often I may take from 149, the number over the second
prick, which I may do 2 times, for 2 times 60 is 120, whereunto
the square of 2 which is 4 being added, makes 124, that subtra-
cted from 149, leaves 25, therefore I put 2 in the
quotient for the second figure of the root, & can-
celling the figures over the second prick, the remain-
der being put over it, the working thereof will stand
in this order, where you see the quotient is 32
for the two first figures of the root, & the figures
of the two first pricks being cancelled, here rests
25, which with the other figures betwixt them,
and the third and last prick, makes 2576, for the
number over the last prick: now therefore to
find the last figure of the root, I multiply the
root already found, that is, to say, 32 by 20, & the
product thereof is 640, that I seek how often it
may be taken out of 2576, the number over the
last prick, which may be done 4 times, for 4 times
640 is 2560, whereunto if I add the square of
2, there will amount 2576: which because it
may be taken from the number remaining over
the last prick, I put 4 in the quotient for the last
figure of the root, and subtracting the former
product of 2576, from the number over the
last prick, which is likewise 2576, there will

204976(3

9

X25

104976132

9

124

20

3

69

2

120

4

124

125

2049761224

9

124

2576

32

20

rest

rest nothing, therefore I cancel those figures, & next I add 104976, & 324
likewise, and thereby conclude 104976 to be a square number, and 324 to be the root thereof:
the root whereof is by multiplying the root that first was found to it self squarely: for if you multiply 18 by 18, you shall have 324, the first given number, 104976 will be
produced, the working whereof hath been already
done: you may see.

This example in my mind might be sufficient with often use and practice; to bring perfection in this kind of Extractions, becausethat although the sum be never so great, it is performed all by one manner of work; yet notwithstanding if I do not think that thou wilt comprehend rather of tediousness of learning, then of the difficulty in teaching, I would give another example: for variety of Examples makes the work seem the more easie. Therefore once again let be a given number, whereof I would know the Square root: first, I put prick or points under the given number, in such order as you see, beginning at the left figure towards the right hand, and proceeding towards the left, leaving one figure unpointed betwixt every prick, where you see that the whole given number consists of 5 pricks, therefore of so many figures must your root or quotient be: then dividing a quotient I seek the greatest square number in 5, which is the number over the first prick, which greatest square number I find to be 4, and the root thereof 2, for two times 2 is 4, therefore I put 2 in the quotient, and adding 4 the square thereof from 5, the number over the first prick, there will left 1, which I set over 5, cancelling the said 5, the work whereof will stand as you see: then for the second figure of the Root, I multiply the first figure of the Root by 20, and the Product is 40, that I seek how often may be taken from 148, the number remaining over the second prick, which may be done three times, for three times 40 is 120, whereunto the square of 3 being added,

makes 129, then I put 3 in the quotient for the second figure of
 the root, and subtracting 129, the last product, from 148, the number remaining over the second pick, there will rest 19, which with the other figures betwixt them, and the next pick, make 1973, therefore I cancel the 148, and setting the remainder over it, I have 1973, for the number over the third pick, and 13 in the quotient for the two first figures of the root: now for the third figure of the root, I multiply 13 the root already found by 20, the Product is 460, which may be taken from 1973, the number remaining over the third pick four times, for 460 multiplied by 4, makes 1840 whereunto adding 16, the square of 4, the Product is 1856, therefore I put 4 in the quotient for the third figure of the root, and subtracting 1856 from 1973, the number over the third pick, there will remain 27, which with the other figures betwixt them, and the next pick, makes 11706; for the number over the fourth pick, and there is in the quotient 234, for the root already found, the whole work standing as above: Again, for to finde the fourth figure of the root, I multiply 234, the root found by 20, the Product whereof is 4680, which may be taken out of 11706 two times, for 4680 multiplied by 2, makes 9360, which with 4 the square of 2, makes in all 9364, the same being subtracted from 11706, the number remaining over the fourth pick, there will rest 2342, which with the other figure betwixt them, and the fifth or last pick makes 23423 for the number remaining over the last pick, therefore making my subtraction, I set the remainder over it, and put 1 in the quotient for the fourth figure of the root, as you may see in the Margin: then to finde the last figure of the root of this given number aforesaid, I multiply the whole root already found viz. 2342 by 20, the Product is 46840, which may be taken from

219

348730625 | 23

4

129

22917

348730625 | 234

4

129

1856

22917

348730625 | 234

4

129

1856

22917

348730625 | 234

4

129

1856

22917

348730625 | 234

4

129

1856

22917

348730625 | 234

4

129

1856

22917

348730625 | 234

4

129

1856

22917

348730625 | 234

4

129

1856

22917

348730625 | 234

4

129

1856

22917

234225 the number over the last prick five times, for 36840 multiplied by 5, makes 234200, whereunto if I adde 25, the square of 5, the whole Product will be 234225, which number is equal to the number over the last prick; therefore I put 5 in the Quotient for the last figure of the root, and subtracting the whole sum of the last product, viz. 234225 from the number over the last point or prick, which is likewise 234225, there will remain nothing, whereby I find 548730625, the given number to be a square number, and the root thereof to be 23425, which is the number found out in the quotient, as in the working thereof you may more plainly perceive.

For proof whereof, if you multiply 23425, the root squarely into it self, the product thereof will be equal to the first given number.

I doubt not, but to any indifferent conceit these two Examples will suffice, as well as if I should contrive a whole Volume thereof, when it is so, that a given number is a right square number: But if the number given be not a square number, it is impossible to find an exact root thereto, but that after the work there will remain something as a fraction or part of a number more to be added to the quotient; for the true and perfect valuation of which fraction or remainder, none as yet could attain; but they have set down so near a way for the extraction of the root of any number not being a square number, that thereby no great error may be perceived: For the knowledge and better understanding of which, let this be a familiar Example. You know that 16 is a right square number, and the square root thereof is 4: But if you would extract the square root of 18, you should have 4 in your quotient likewise for the root thereof, but then there will rest 2, whereby you see that 18 is no square number, neither can you know what fraction to make of it, by reason that you have no certain Division, what might stand for Denominator to the Numerator or Remainder: Only let this suffice, that to find the nearest root thereof the Rule is thus, Double the remainder for the Numerator, and Quadruple, viz. multiply the root by 4, and thereto add 1 for the Denominator to the said Numerator, as in this Example. To extract the nearest square root of 18 I find 4 to be in

$$\begin{array}{r} 18(4.\frac{1}{2} \\ 16 \end{array}$$

the quotient, and 2 remaining, which 2 being doubled, makes 4 for the β imparator, and 4 the root being multiplied by 4, makes 16, and 1 added therewith makes 17 for the Denominator, where-by I say, that $4\frac{1}{17}$ is the nearest square root of 18, which may be found out: For if you reduce $\frac{1}{17}$ into one common denomination, and then multiply them squarely, the Product will be $17\frac{1}{17}$, which is but $\frac{1}{17}$ too little.

Thus having declared the order how to extract the square root of any number; it resteth now that I shew the manner of extracting the Cube root of any number: As for the principal uses thereof you shall find in the general practice of the Mathematicks.

To find out the Cube root of any given number, being a right Cube number: first, put down the given number, and as in the square number, you put points or picks, beginning at the right hand, and so towards the left leaving betwixt each point one figure void; so in the extraction of the root of a cube number, you must leave 2 figures void or unpickt betwixt every point: And as in the square root, so likewise in this: look how many points are under the given number, so many figures must be contained in the root thereof, which is also to be observed in extracting the root of any quantity whatsoever. These things being considered, it is also necessary, that you know the greatest cubick number of every of the nine unittes, whereof the Table hereunder specified maketh explanation: where you see that against each unitte standeth the cube number thereof: which being known, and the given number pickt, with a quotient drawn as before I have shewed, to extract the cube root you have two numbers, viz. 300 and 30. But because the working thereof would be too long to express in terms, let 13824 be a given number, whereof I would extract the cube root.

First, I put down that number aforesaid with points under it, and a quotient in this order, 13824 (whereby I see that the root thereof must consist of two figures, because so many points do belong unto the given number: For the first figure whereof I seek the

1....	1
2....	8
3....	27
4....	64
5....	125
6....	216
7....	343
8....	512
9....	729

the greatest Cube number contained in 13, the number over the first point towards the left hand, which I find to be 8, the Cube root thereof which is 2, I put in the quotient for the first figure of the root, and subtracting 8 from 13; rests 5, which I put over 13, cancelling the said 13, which done, the work will be as below.

Now for to finde the second figure of the root, I set down the two numbers which serveth for the extraction of the Cube root, viz. 300, 30: and against 30, I put the root already found which is 2, and against 300 the square thereof which is 4; these two figures I set towards the left hand of them: Then I multiply 300 by 4, the figure which standeth against it, and the product is 1200, that I seek how often I may take from 5824, the number over the second prick, which I may do four times, therefore I put 4 in the quotient for the second figure, and upon the right hand against 300 I set 4, the last found number in the quotient, and against 30 I put 16, the square thereof: and underneath 30 I put 64, which is the Cube of 4, then multiplying all the figures which are in a row into one Product, viz. 4 by 300, makes 1200, and that again by 4, makes 4800 for that Product: Then for the next, 2 by 30 makes 60, and that by 16, makes 960 for the second Product, which I set down together each under other: Lastly, because 64 hath no other number to be multiplied therewith, I put that down under them; which done, I adde them altogether, and the total sum is 5824, the same subtracted from the number over the last prick, leaveth nothing; whereby I see that 13824 is a Cubick number, and the Cube root thereof is 24, as you may more plainly see by the working thereof. which is put in the margin abote, where you see that

$$\begin{array}{r}
 5 \\
 23824(2 \\
 \underline{8} \\
 43004 \\
 233016 \\
 64 \\
 30 \\
 2 \\
 \underline{60} \\
 16 \\
 \underline{960} \\
 4800 \\
 960 \\
 64 \\
 \underline{5824}
 \end{array}$$

24 being multiplied into it selfe, and that
Product again by 24, the first multiplier,
the product is 13824, which is equal to the
first given number.

Again, seeing that Examples are the
easiest method of teaching, and plainest for
understanding; let 12551868224 be a
given number, whercof I would extract
the Cube root. First, having prickt it, and
drawn a Quotient for the Root, thus,
1255 818224 I see that the root must con-
sist of four figures so many prickes being
under the given number. For the finding
of which figures, I seek first the greatest
Cube number in 12, which is 8, the root
whercof being 2, I put in the quotient for
the first figure of the root, subtracting 8
the Cube thereof from 12, the number o-
ver the first prick, rest 4. Then for the
second figure of the root, I put down 300
and 30, the numbers for the Cube root, a-
gainst 30 I set 2 the root found, and a-
gainst 3004, the square thereof, and mul-
tiplying 300 by 4, the product is 1200, that

may be taken out of 4551, the number over the second prick, three
times; therefore I put 2 in the Quotient, and likewise after 300,
and the square thereof which is 9, after 30, and the Cube thereof
which is 27 I put under 30: When I multiply all the numbers
in the first row each by the other, viz. 4 by 300, makes 1200, and
the same product again by 3, makes 3600, which I set by it self:
Then I again multiply 2 by 30 is 60, & that again by 9, makes 540
which I put under the other product; lastly, because 27 hath
no number wherewith to be multiplied. I set down, like-
wise under both the other, & the three numbers being set in
order one under another as you see, I adde them all toge-
ther, & the whole product is 4167, the same I subtract from
4551, the

1824

24

24

24

96

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the number over the next pick 4167, and there will remain 384 to join with the number over the third pick: which done, the work will stand in this order, as you see.

Now for the third figure of the root, I put down 300 and 30, as before, and against 30 at the left hand, I put 22, the root already found, & against 300 I square thereof which is 529; then multiplying 529 by 300, the Product is 158500, which may be twice taken from 84868, there-fore I put 2 in the quotient for the third figure of the root, and likewise put 2 to the right hand of 300, and the square thereof which is 4, at the right hand of 30, and the Cube thereof being 8, I put under 30; which numbers will stand as above: When multiplying all the numbers in one row, each by other into one Product, viz. 529 by 300, makes 158700, and that again by 2 is 317400 for the whole Product of that row, which I set down by it self: Then I multiply 23 by 30 is 690, and that again by 4 is 2760 for the Product of the second row.

Lastly, because 8 hath no number with it. I put it down under the other, and then adding all three summes together, the Product is 320163; the same taken from 384868 the number over the third pick rests for the number over the last pick 64700224, and in the quotient is 232, the whole work being as you see above.

Now to find the fourth and last figure of the root, I put down the two numbers again, which serve for the Cube root, viz. 300 and 30. At the left hand of 30 I put 232, the numbers in the quotient, and at the left hand of 300; I set the square of 232, which is 53824 in this order: then multiplying 53824 by 300, the Product is 16147200, which I seek how often may be had in 64700224, the numbers remaining over the last pick, that may be done four times: Therefore I put 4 in the quotient for the fourth and last figure of the root, and also I set the said 4 at the right.

right hand at 300, and the square thereof, which 53824...300, 4
 is 16 at the right hand of 30, and the Cube there: 232...30, 16
 of being 64, I put right underneath 30, which 64
 done, all the numbers will stand as above: Then multiplying all
 the numbers in each row into their several Products, viz. 53824
 by 300, makes 16147200, that again by 4, is 64588800, which I
 set by it self: Then again 232 by 30, is 6960, the same product
 by 16, makes 111360, which I put down under the other.

Lastly, because 64 hath no other number to be multiplied there-
 with, I put it down like wise under the other two numbers, and
 adding the three products together, the wholesum thereof will be
 64700224, which being subtracted from the number remaining o-
 ver the last pick, leaves nothing: So have I in the quotient
 2324, for the Cube root of 12551868224 the given number: the
 whole work whereof is here set down in the margin, for the
 proof whereof, if you multiply the root, viz. 2324, Cubically in it
 self, the product thereof will be equal with the first given number,
 as for Example you may see in the working.

Where you see that 2324 the root, being multiplied into it self
 squarely, and then likewise the whole Product thereof again by
 the same root 2324, the total sum amounting thereof, 12551868224
 is the first given number.

But when you have a number given to ex- 12551868224
 tract the Cube-root, and the aforesaid given number be not a right
 Cube number, whereby you cannot come to any perfect root
 thereof, but that there will remain some fraction or broken num-
 ber after your said extraction; the only manner to extract the nearest
 root of a number not Cubical, as most writers do affirm, is thus.

The difference betwixt the Cubick number of the root, and the
 Cubick number of a number more then the root by an unity, shall
 be the Denominator to the remainder, & also added thereto.

As for Example.

Let 12 be a number given, which not being a right cube num-
 ber, I would find the greatest root thereof: First, the greatest
 Cubick number in 12 is 8, the Cube root whereof being 2, I put
 in the quotient, and subtracting 8 the cube thereof from 12, there
 will

will rest 4, which 4 being over, sheweth that 12 is no cubick number; therefore adding 1 to 4, makes 5, which I put for the Same-rato; and to find the Denominator thereto, I set down the cube 2 the root found which is 8, and likewise 27 the cube of 3, which is a number more then the root by 1; then subtracting the one from the other, viz. 8 from 27, leaves 19 for the Denominator. By which reason the nearest cubick root of 12 is $2\frac{1}{3}$, which being reduced and multiplied cubickly, makes $11\frac{1}{27}$, the same abbreviated, makes 11 and very near $\frac{1}{3}$, and it should be 12, therefore the error is $\frac{1}{3}$ too little, which although in this is no great error, yet in a great sum, the error would be very much: Therefore for those which desire a more exact & perfect extraction of the Square or cube root from numbers not being right square or cubick numbers, I Record in his Whetstone of Wit lettereth down an exact way (but very tedious) which is thus. For the Square root add to the given number so many times two ciphers, as you desire the nearness of the root: And for the cubick root so many times 3 ciphers as you desire the exactness of the Root thereof: and under the said ciphers put picks in such order as before is taught, and then mark how many picks there is over and beside the picks of the given number, and then extract the root from all those ciphers in such order as you did before: For if there be one more, the Root shall be tenths, and the remainder parts of $\frac{1}{10}$; if there be two points or picks over more then the given number, then the root shall be hundredths, and the remainder parts of $\frac{1}{100}$; if three picks be over, the root shall be thousands, and the remainder parts of $\frac{1}{1000}$, and so you may come to a very neer root. but not to an exact or perfect root, unless the given number be a right square or cubical number.

A Declaration of the Tables of Longitude and Latitude
of places following.

The Tables hereafter following shewing the Longitude & Latitude of places, viz. of Kingdomes, Provinces, Cities, Isles, Capes,

Capes, Bays, Rivers and Mountains, especially the most principal of them in the whole world, are gathered from y^e latest Descriptions, Maps, and Charts, as well universal as particular: who albeit they differ greatly in Longitude, yet in Latitude most of them agree, and also having a respect to the beginning of each of their severall Longitudes, they come all to a near agreement. For some beginning their Longitude at y^e Westermost part of Africa, makes the Longitude of London to be about 10 degrees 20 min. Others beginning at the Canary Islands, makes the Longitude of London 18 degrees. Others more Westward make it 19 degrees 30 minutes. And Jodocus Hondius beginning the Persianian at the Ile Pico, one of the Azores, makes London to be in Longitude 27 degrees 40 minutes. But y^e following M^r. Emery Mullineux, according to his great Globes, do account the Longitude from the Westermost parts of St. Michaels, another Ile of the Azores, the most of which Ile is 50 minutes in Longitude, and from the Westermost part thereof, the Longitude of London is 25 deg. 40 min. which in effect is not much different from any of the others. Note, that the Longitude is counted from the Persianian, passing over the aforesaid place Easterwards into a continual progression to the end of 360, which is the whole Circumference of the World. Latitude is counted from the Equinoctial to the end of 90 deg. on each side thereof. And where the Letter S is after any number, it shews the place to have so many degrees and m. of South latitude; all the rest having no Letter adjoining, have North Latitude; the whole being set in Alphabetical order for the readier finding of any place therein contained. And where the Longitude and Latitude of any Kingdome is set down noted with this syllable Reg. it expresseth the middle thereof. Further, at the end of such places as begin with one Letter, is left a space, wherein the Traveller may insert such places, whereof the Longitude and Latitude is to him known, and not herein expressed.

A Table of the Longitude and Latitude of all the Notable places of the World, newly cor- rected and Enlarged by Mr. T. Stern Globe maker.

	Longit.	Latitude		Longit.	Latitude
A			Alleluys	70 31	10 01
A Caprice	16 00	19 00	Almedina	34 01	33 41
A Canij an Ma.	329 01	12 01	Alpes a Mountain	41 29	19 29
Angos and Head	377 01	19 01	Aligubas	147 11	38 41
Achaguan	101 30	09 30 S	Amazen	45 29	12 41
Achin	132 30	34 40	Amazona Reg.	323 01	13 01
Aden	81 10	10 01 S	Las Amazona	312 29	12 40 S
Adia	50 18	27 01 S	Ammon	59 41	27 11
Adu	105 41	08 41	Amsterdam	33 01	51 29
Agape	64 03	30 01	Averie a Mount	116 00	14 00
Africa Reg.	40 01	30 01	Ancona	63 31	01 31
Agouta	162 21	38 01 S	Ancona	43 29	43 51
Agouta	144 29	08 31	Amboina	161 54	03 20
Agouta Laguna	253 29	44 01	Abona	164 30	06 10 S
Agouta de gano	245 20	28 00	Amiona	75 20	12 40 S
Alina a Mountain	98 41	14 30	Andropoly	58 11	44 41
Alcarnes	283 05	22 01	St. Andre	170 23	12 01
Alagos	58 41	12 41 S	St. Andre	22 11	56 21
Albion	235 01	50 00	St. Andreas	62 11	61 11
Albion	109 29	25 29	Las a negadas	296 00	50 01 S
Alboran	25 29	38 26	Angier	24 41	47 35
Albrough	26 31	12 20	Anglesey	19 51	54 00
Alpe	72 29	38 01	Anglia Reg.	23 00	53 00
Alenda	23 04	40 19	Angoleme	27 01	46 00
Alexandria	65 01	31 11	Antiochia	300 05	06 40
Alexandria	73 11	36 41	Antipara	74 01	25 10 S
Alghia	16 00	29 01	Antwerpen	31 20	50 30
Alghia	33 01	35 21	Arabia Felix	83 00	21 00
Alghia	63 41	26 41	Arabia Desert	77 00	30 00
Alghia	28 41	39 01	Argier	32 50	35 40
Alghia	76 30	43 31 S	Armenia Reg.	76 00	41 00
Alghia	44 21	38 29	Armenia a Mount	35 00	11 30 S
Alghia	108 41	37 01	Alghia	353 20	18 50

A B	Longit.	Latitude	B	Longit.	Latitude
La Ascension	15 30	08 00 S	S. Bartholome	194 30	14 00
Assyria Reg.	85 00	36 00	Bermoudes	316 30	34 30
Athens	56 10	41 00	Basel	37 10	47 50
Avero	17 30	42 10	Beclafa	65 00	10 30
Augustine	191 00	19 30	Beil	76 15	27 10
Amburgh	38 40	48 30	Belef	69 00	11 40
Azur a mountain	59 00	21 40	Beliff	18 30	47 00
Amiens	28 30	49 40	Belt	74 40	10 00
B			Bengala Reg.	126 00	26 30
Antam	140 00	05 40 S	Benichao	136 00	03 50
Babylon	81 20	33 00	Benin Reg.	41 00	07 40
Babel mandel	80 00	13 50	Bepius a mount	143 00	34 00
Bachu	88 50	42 00	Bepirus a River	138 20	34 00
Bactriana Reg.	115 00	38 30	Berga	40 10	62 50
Bagafus a lake	77 10	50 40	Bergon	30 30	60 58
Baharem an le baie	87 20	27 30	Barwick	22 50	55 50
Bay Anegada	319 50	46 20 S	Bethle	138 50	25 40
Bay de baxos anc-	321 30	39 10 S	Baifer Reg.	50 00	04 00
Bianza (gados)	149 25	03 00 S	Brailgod	58 30	47 50
Batavia	123 00	01 20 S	Bilbao	05 30	43 50
Bay a Dalagoa	56 10	32 10 S	Blaskey	14 30	54 50
Bay de Fumos	240 20	36 00	Blaves	31 10	40 50
Bay de St. Migel	39 30	08 40	Blayer	21 15	49 50
Bay de Ochohora	312 30	41 00	Bloe	5 30	07 00
Bay de pinos	233 00	40 30	Borneo	145 30	03 10
Bay Langos	18 00	37 30	Bornholme	40 50	55 00
Bacalaro	335 04	48 28	Bovenbergem	34 20	50 50
Bayona	17 20	42 10	Brandenberg	42 30	50 50
Bayone	25 30	44 00	Brasile	5 10	56 00
Baliera	81 04	31 10	Brasile Reg.	345 00	10 00 S
Bamberg	39 15	50 30	Brava	74 30	00 30
Bandu	173 30	33 00	Brest	30 00	48 50
Bax de los percos	345 30	20 00 S	Briage	25 30	45 50
Barbados	328 20	12 40	Brage	29 00	47 50
La Barbada	191 50	01 50 S	Buda	48 00	00 50
Barlingas	16 20	39 30	Burdiaux	26 00	45 00
Barnagoffos Reg.	70 00	13 00	Briflowe	22 50	51 50
			Brachipulus point	21 25	52 00
			Wales		

C	Longit.	Latitude	C	Longit.	Latitude
Cap Rafalgare	96 27	22 27	Cambala	161 11	41 40
Cap raso	317 40	08 00	Canada	305 11	40 25
Cap roxent	16 29	38 50	Caharia Grand	9 29	27 25 S
Cap roxo	11 01	22 00	Canda	59 19	37 28
Cap of good hope	50 30	35 40 S	Caribes	316 11	07 00
Cap del Spirito San.	161 11	15 11	Cartagena	300 01	20 11
Cap S. Vincent	17 00	37 00	Cartagena	18 21	38 20
Cap Vend	9 51	14 20	Cartago	199 29	05 11
Cap de bona vesta	334 21	49 11	Casca Reg.	38 31	17 11
Cap. Wallingham	321 01	63 41	Caster Reg.	132 01	69 09
Campon Reg.	836 01	47 00	Cataio Reg.	150 01	53 01
Cairo	67 29	30 00	Carnes	23 09	58 29
Calamita	67 41	18 10	Carwichie	41 11	69 11
Caldy	20 01	51 40	Chester in England	27 49	53 51
Calcut.	312 41	10 19	Chichester	24 11	51 00 S
Calice in France	29 10	50 40	Childies cape	326 41	67 29
Calbia Reg.	42 10	36 20	Chilly Reg.	305 00	50 01
California	145 00	30 00	Chirman Reg.	98 00	26 29
Camanor	500 20	16 30 S	Cicra	53 29	31 00
Cambaba	150 00	08 20 S	Cypria	68 04	37 30
Cambaya	110 00	22 00	Cleatstone	50 59	47 01
Cambaya Reg.	142 20	31 40	Cocaz & Moumino	79 00	47 29
Capla pa	304 50	34 00 S	Cholia	114 00	09 24 S
Casma River	121 40	61 00	Calao Reg.	330 00	16 00
Castrum Portugal	57 10	10 20 S	Calmogory	62 41	63 31
Cazan	86 20	54 30	Colne	34 00	51 01
Chaga	56 00	09 10 S	Commania Reg.	86 00	56 00
Chisle	56 20	07 00 S	Copgu	147 21	49 21
Chilgazata	294 30	06 30 S	Ceminsberg	49 11	54 20
Chib	58 30	40 30	Constantinople	62 02	44 00
Chiquisamba	305 30	17 00 S	Copenhage	38 29	59 01
Cosie	65 00	21 30	Cornau Reg.	108 01	37 00
Costa	48 20	03 10 S	Coshe in Ireland	15 40	52 00
Cora	85 20	19 20	Coshe an Island	22 20	32 40
Coronades	196 30	45 00 S	Coshe	54 31	52 00
Copo Santo	84 10	07 30 S	Cosica	38 10	42 00
Quana	313 30	07 00	Cornu Reg.	230 00	52 00
Casco Reg.	197 20	13 30 S	Cracon	48 29	50 00
Cales in Spain	20 51	36 20	Cuba	196 00	36 40

F G	Longir.	Latitude
Forteventura	11 00	28 00
Foye	15 50	55 30
Frailles	32 40	16 20
Frankfort	36 30	50 00
Frisland	351 30	62 00
Forbithers frait	331 20	64 00
A Furious Overfal	322 30	60 00
Farre llands	17 00	62 10
Farnil lle	24 45	60 00
Ferando	164 00	32 35

G	Longir.	Latitude
Gago Reg.	25 00	08 30
Galathia	37 20	37 00
Gambra a Ri.	12 00	13 10
Gant	30 20	50 40
Garamantica	51 30	16 00
Garnefey	22 20	49 40
Gaza	70 50	33 10
Gimba	64 40	19 30 S
Gargiza	61 40	12 00 S
Gemenacota	118 40	00 00
Genova	33 40	46 20
Genua	37 50	45 00
Genoa	15 20	16 00
Gerguth Reg.	153 00	57 00
Germanarce	40 00	51 00
Gedelfvin	24 30	32 20
Gonera	7 30	27 00
Ghir a River	25 30	22 00
Giamber	18 01	33 41
Gilberts found	326 51	67 01
Giras a Riycc	41 21	20 11
Galloway	15 49	53 15
Gos	102 22	15 14
Glogow	29 00	57 00
Golfo de Bengala	125 00	25 00
Golfo de S. Helen	48 41	33 29 S

H	Longir.	Latitude
Hales Island	337 30	43 00
Haliber	78 41	20 00
Halicz	52 51	48 45
Hamborough	37 11	53 21
Harlepool	24 00	55 21
Harwich	27 29	52 00
Havana	192 11	23 00
Hebrides	15 20	58 00
Heydelberg	36 00	49 00
Heist	23 29	46 29
Heishanc	19 29	48 41
Heptapolis	64 29	25 21
Hercules Pillers	69 21	32 11
Hellichland	33 51	66 00
Hercania Reg.	100 00	40 00

H. I.	Longit.	Latitude	H. I.	Longit.	Latitude
Hispania Reg.	15 00	40 00	Isla de Corajales	194 40	09 30
Nova Hispania	180 00	13 29	Isla de S. Juan	178 00	31 01
Hispaniola	306 00	18 29	Isla del fuego	2 30	14 21
Holindal	36 11	61 01	Isla de los fuegos	181 29	27 40
Wanta Oort	48 30	59 01	Isla de los Galopos mayores	281 10	04 00
Horne	12 10	66 10	Isla de los Galopos menores	277 30	01 10
Hull	25 21	53 45	Isla de Hombres blancos	169 21	05 41 S
Hungaria	50 00	43 01	Isla de S. Jago	158 20	18 00 S
Hidaspes River	124 00	33 21	Isla S. Ivan	164 30	06 00
Hipais a River	124 00	33 01	Isla de los Ladrones	177 21	15 11
Helin head	15 00	55 15	Isla de los lobos	307 41	40 21 S
Hereford	22 38	52 12	Isla de S. Maria	296 29	37 03
Heel of Danthick	46 10	55 40	Isla de Martin vaz	11 21	21 01 S
			Isla de Mayo	4 29	13 29
A mbick	121 30	01 15 S	Isla de S. Michael	0 00	38 25
Jacarta	140 00	06 00 S	Isla de Negros	155 29	10 29 S
Jamaica	298 30	17 00	Island of Fowles	334 00	50 00
Jasques in Persia	9 40	25 40	Isla de Orleans	321 00	50 20
Japan	169 00	38 00	Isla de pajaros	314 00	32 41
Jarley Island	23 00	49 20	Isla de Palmas	163 21	06 00
Javanajer	140 00	09 00 S	Isla de Paxaros	298 51	08 51
Java minor	151 00	08 00 S	Isla de Paxaros	234 21	28 00
Jazin	77 30	40 30	Isla de Pearles	293 20	07 00
Jappa	141 20	07 40 S	Isla de Pines	292 21	21 29
Jeucho	73 01	33 00	Isla de Rees	162 00	25 20
Jerusalem	72 21	33 00	Isla of Salt	5 00	16 29
Jiquenas a River	105 00	27 00	Salomon Island	104 40	10 00 S
Imaus a mountain	128 00	39 00	Isla Solis	347 00	10 29
India Oriental	135 06	26 01	Isla S. Thomaz	38 00	00 00
Ingus a River	145 20	26 00	Isla S. Thomas	252 00	20 11
Ingung Islands	40 41	42 50	Isla de Verde	353 51	41 29
The three Islands	169 21	40 02 S	Isla S. Vincent	175 70	08 00
Isla de Avis	310 30	11 09	Isla S. Vincent	73 21	20 29
Isla de Avis	173 50	04 30	Isla de S. Catalina	234 10	27 30 S
Isla de bastinado	293 30	10 30	Isla de S. Cedros	240 30	29 30
Isla Brava	1 20	14 20			

I. K. I.	Longit.	Latitude	L. Longit.	Longit.	Latitude
Isle de Saman Jaro	354 40	03 20 E	Lancaster	114 1	23 30
Isle de Lima	295 10	22 00 E	Lapow	51 11	20 20
Isle Socas	46 2	29 10 E	Larade	21 58	43 00
Isle de Tristan de	26 3	36 00 E	Larifa	70 00	37 00
Acupia			Larsa	53 00	40 00
Ioam	135 00	07 49	Latre de Goulleme	306 40	48 00
Islofo	24 19	06 00	Latus amibus	131 00	60 10
Ipwich	27 12	52 22	Latus fallus	137 40	47 30
Ioppe	71 21	34 00	Leoa	21 12	42 15
Isbellia	305 21	18 51	Leon	283 41	11 22
Island	08 00	66 00	Leopolis	51 51	42 00
Italy Reg.	042 20	43 00	Lepin	98 00	58 47
Ireland	16 00	53 29	Leguis Major	165 00	28 00
Iucatan Reg.	283 00	18 00	Legulo Minor	158 41	22 00
Iugor	128 00	07 50	Leida	28 21	41 30
Iuica	31 21	19 30	Leister peynt	335 00	62 00
Iulibella	61 00	02 30	Eina	296 41	23 30 S
			Eimonia	72 15	44 20
K			Lymofa	43 29	54 50
K Almachy in	95 00	51 00	Liams	32 41	47 40
Kartaria			Lierne or Ligora	40 21	43 30
Karabishash Reg.	119 00	52 00	Lifton	17 29	32 21
Kafshky Tartaria	103 00	52 00	Lyzard	18 30	40 10
Kibals Reg.	110 00	57 00	Londin	25 30	51 30
Kibasya Lake	112 31	53 00	Londoripa	326 11	72 00
Kela	54 51	69 00	Lepfo	74 01	49 41
Kalerig	04 11	65 20	Leyre & River	24 14	49 42
Kefar & River	96 40	49 00	Longfound	34 30	50 57
Kineale	19 20	56 45	Lobee	38 02	43 52
Kinsale	15 03	58 35	Lucka	42 11	51 00
			Lucky	62 00	50 21
L			L. Lundy Inlet	320 00	67 00
Lacierna	24 50	32 30	Luna & Mountain	66 00	50 00
Ladena	53 30	47 31	Lundy	79 02	51 00
Ladoga	62 12	63 40	Lutzke	54 00	50 21
Lago de las coro-	295 03	54 00 S	Luzon an Island	156 00	17 00
nadus			Lybia	33 00	23 30
Lampela	26 21	33 00	Lin	29 25	52 48
			L. Lincoln	25 25	53 22

Latitude	Longit.	Latitude	Latitude	Longit.	Latitude
M				M	
Machia	65 41	23 50 S		Margarita	314 11 10 50
Machia	106 41	00 39		Margalante	320 00 15 00
Machochenta	93 51	33 41		Marmos	306 21 40 40
Machin Island	91 30	75 30		Marsoco	20 00 30 19
Macyra Island	95 00	29 40		Marcellis	33 51 43 40
Madeca Islands	8 11	31 29		Maslig	23 29 30 20
Mecoris palus	71 30	39 20		Milford haven	20 25 51 48
Magadoca	78 00	05 11		Mistagen	30 01 35 20
Magalo	71 20	09 29 S		Mizaker	167 00 33 00
Maida	2 40	46 40		Madagascar	77 00 19 05 S
Magellan Straights	305 00	53 45 S		Marecapare	312 10 68 00
Majorca Island	31 31	30 00		Meander mount.	152 00 31 30
Malibito	178 51	16 00		Malestream	36 00 67 22
Malaca	137 00	03 30		Meb	46 29 54 30
Malaga	23 51	37 22		Medina city	23 29 41 10
Maldivean Island	13 00	03 00		Medina talnaby	37 00 27 20
Malora	31 31	30 00		Manila	156 00 03 16
Makran Harb.	6 00	35 31		Medino	98 29 36 29
Manan Island	19 00	54 51		Middleburg	20 40 52 00
Mosambique	70 00	14 32		Meissen	41 00 51 10
Mapador	16 20	31 50		Melinde Reg.	71 21 03 20 S
Mamora	155 00	00 30		Melley Reg.	15 41 13 00
Mombela	72 00	04 50 S		Melving	48 01 54 50
Mangche	61 91	41 29		Mems	35 51 50 00
Mangichina	150 00	37 00		Mesher	85 29 52 50
Manica	62 51	23 29 S		Melopotamia	78 01 35 00
Maniconga Reg.	46 00	05 00		Methana	45 51 37 50
Maniola Island	140 30	03 50 S		Metz	33 29 49 45
McCrehan Isle	330 00	62 21		Mien Reg.	136 01 31 00
Mare de Bachuor	92 00	45 00		Mienskow	56 41 54 50
the Caspian sea				Milhaine	38 29 06 10
Mare Congelatum	345 00	64 00		Minorca Isle	342 6 40 00
Mare de India	120 00	10 00 S		Moldavia Reg.	55 00 46 00
Mare major	68 00	46 00		Molins	30 21 46 40
Mare mediterr.	59 00	35 00		Mollucca Island	160 41 61 00
Mare rubrum	75 00	20 00		Momorancie	130 00 47 00
Mare vermeio	155 00	26 00		Mongul Reg.	160 00 61 30
Mare deltzur	270 00	15 00		Monte de Brand	47 11 0 15 S
				Mount Frogoso	344 00 00 S

MN	Longir.	Latitude	NO	Longir.	Latitude
Mont negro	44 41	17 00 S	Nieflor	57 40	52 50
Mont raleigh	320 30	61 00	N. h. a River	67 30	31 00
Mont royal	301 00	45 40	Ninus	84 10	31 00
Morea Reg.	54 30	38 00	Nisa	36 10	44 00
Musaick	68 50	51 00	Nissa	45 30	70 30
Mofanbique Reg.	70 10	14 40 S	Naze in Norway	31 00	58 00
Moscovia Reg.	80 00	59 00	Noes a mountain	30 00	40 22
Moscow	70 00	58 43	Nolon	30 00	40 22
Mofia	84 30	35 00	Nombre de dyos	294 29	09 22
Mosul	84 00	34 55	Norumbega	315 41	43 41
Mozena	24 20	34 30	Norweigh	35 00	63 02
Moa	96 36	21 31	Novograde	57 11	53 03
Minas	165 00	26 20	Nowgrad	63 29	51 41
Mefeneck	69 50	51 30	Newgorod	62 31	50 19
Munster	35 00	52 10	Newgorod	80 01	55 21
N			Nubia Reg.	57 02	13 00
Nabarz	79 50	50 50	Nubia a River	57 02	15 41
Naiman Reg.	140 00	64 00	Norenberg	39 09	49 29
Naynen	31 10	50 00	Norwich	27 25	52 45
Nantes	24 10	47 50	O		
Napoly	45 00	41 00	O By a River	107 03	55 00
Napoly	55 10	38 00	Occa a River	77 29	55 41
Napthaly	73 00	34 30	Olant	43 29	57 00
Narbona	30 20	43 20	Oleron	24 29	45 39
Nardenborg	47 10	67 05	Olone	24 29	47 00
Narve	56 10	60 00	Onagua Reg.	310 00	09 00
Narvare	16 40	41 39	Omba	54 11	66 51 S
Naseph	110 30	45 00	Onega a river	56 41	64 00
Natolia Reg.	66 00	41 00	Onegaburg	59 29	62 20
Nazareth	72 00	34 10	Opawkow	69 10	53 30
Newcastle	23 10	55 20	Orades Iles	22 11	59 01
New found Land	334 20	46 30	Orclana	310 00	05 00
Nicaria	59 30	29 30	Oriza Reg.	119 01	19 02
Nicobexan Island	130 30	06 40	Orleans	28 29	48 02
Nicomedia	63 30	44 20	Ormus Ile	91 20	28 40
Nicopolis	56 30	45 00	Orsa	59 51	54 21
New England	315 00	43 00	Orsa	41 21	61 29
New Plymouth	315 00	41 37	Otrona	44 29	41 40
New Salem	315 10	42 35	Otronto	49 24	40 21

O P	Longit.	Latitude	P	Longit.	Latitude
Oxford	24 00	32 00	Piccola Reg.	317 00	10 02 S
Oya Reg.	75 00	13 00	Pigmea	148 41	32 02
Offend	29 29	11 29	Philingu	144 21	40 02
Orange	30 35	43 35	Plna	296 21	03 01
Orilance	27 52	47 42	Pirga	101 40	14 20 S
Old-found	31 36	11 35	Port de los Leon.	318 00	42 30
Ortodoxa	28 00	12 15	Piramides	173 12	20 21
P			Pifa	40 29	43 41
Paganfa	39 51	45 00	Pizan	73 00	51 29
Palto	290 30	05 10 S	Plata	315 00	19 51
Palagofa	47 29	43 00	Plimsouth	21 11	50 51
Palandura Island	108 00	11 00	Poosko	48 11	52 41
Palatia	60 51	39 21	Plotsko	57 29	57 41
Palma Island	6 21	18 00	Podolia Reg.	19 00	49 29
Palona	105 40	02 00 S	Poyediers	26 29	47 21
Palmer	120 00	41 00	Poldaved	20 05	47 55
Pambelona	24 29	42 41	Polonia Reg.	53 01	50 00
Panama	394 29	08 11	Buen Port	177 21	12 00 S
Panranalia	42 50	36 29	Port de Canoas	239 21	36 41
Panuco	270 11	22 30	Port de Cavallos	203 00	14 21
Payia	375 50	46 10	Port de la Contep.	45 40	24 21 S
Pazrick puyato	15 55	54 35	Port Desire	313 00	47 41 S
Paris	29 02	48 29	Port Famine	502 51	53 11 S
Pasma	39 29	41 11	Port Fremo	44 00	04 00 S
Paffen	41 50	48 41	Port Delgado	42 11	03 51
Paura	37 51	46 11	Port de S. Miguel	240 29	35 02
Paznafa	155 29	45 51	Port de Nigrillo	296 51	17 11
Pechora	65 51	67 00	Port a Port	17 30	41 15
Pechora Castle	73 51	64 51	Port Sallido	186 41	03 00 S
Pegu	135 00	20 00	Port Santo	10 00	32 29
Peim Reg.	132 00	51 29	Port S. Vincent	337 21	23 51 S
Perigo	313 21	43 21	Prage	42 29	50 00
Perrow	53 29	58 41	Prellaw	49 41	51 11
Peru Reg.	296 00	10 00 S	Prellaw	49 41	49 45
Perusia	42 20	43 11	Portland	22 40	50 40
Pescara	34 29	30 11	Point Comfort	319 10	37 12
Phillipina Island	158 00	19 00	Primsberg	48 30	55 11
Palumbam	142 40	07 30	Prussia Reg.	50 00	54 06
Pico	316 41	38 21	Prodomais	66 41	9 40

P & R	Longit.	Latitude	R S	Longit.	Latitude
Punto de S. Hellen	290 11	02 11 S	Rio grande	314 29	44 00
Punto de S. Hellen	345 21	37 30 S	Rio del gusto	281 29	29 29
Punto de S. Lucas	152 29	23 29	Rio de la Hacha	304 15	10 41
Priaman	118 09	00 20	Rio de S. Helena	348 41	10 39 S
Q			S. Laurence River	318 51	53 00
Qlanzu	157 29	44 10	Rio de Manicong	48 21	10 00 S
Quelenfu	158 29	36 01	Rio del Oro	10 21	23 29
Quiansa	144 41	42 20	Rio de palmas	272 11	14 21
Quiloa Reg.	69 51	08 59 S	Rio Panuco	271 51	33 29
Quinza	153 00	40 01	Rio de perla	292 29	19 00
Quito	293 01	00 11	Rio de la plata	326 29	36 00 S
Quivira	233 00	42 00	Rio primero	327 41	55 00
R			Rio sancto	300 29	03 00 S
Agasi	40 29	44 00	Rio de spirito san.	181 29	31 00
Ramfeca	68 29	20 30	The white River	308 11	51 21 S
Ranc	352 41	63 00	Rypon	35 29	55 21
Ravenna	42 21	44 21	Roan	27 41	48 51
Rhodes	61 41	37 11	Rochel	25 29	46 41
Rhismech	94 41	40 00	Romey	42 29	42 00
Ribadeo	10 21	43 21	Roofewicke	40 21	54 00
Richman Ifle	327 30	41 34	Roftowe	72 11	57 00
Riga	53 30	58 00	Ruffia	57 29	19 29
Rems River	30 35	49 12	Rye	27 29	51 01
Rio de Aboledas	329 00	01 41 S	Rio de senega	14 25	15 06
Rio de S. August	350 00	15 03 S	S		
Rio de S. Barbary	326 41	34 02 S	S Abarfa	154 51	45 00
Rio del Basil (nes	348 21	17 14 S	Sableftina.	114 00	34 00
Rio de los camero-	42 00	05 25 S	Sabron	84 51	45 11
Rio de Camarones	315 00	44 29	Saffe	16 10	32 10
Rio del campo.	42 29	02 51	Saendeber	174 41	35 51
Rio d' angla	42 30	01 40	Sagatin	95 29	58 21
Rio de Canno.	308 40	33 10	Sala	89 41	48 00
Rio dulce	316 29	52 00 S	Salamanca	20 29	40 01
Rio de S. Domingo	353 00	07 51 S	Salsaga	72 41	41 51
Rio del eftremo.	340 41	22 59 S	Salina	45 00	38 28
Rio de Flores	285 19	29 00	Salle	20 10	33 30
Rio del gado	34 21	06 21	S. Sebastina	24 25	43 15
Rio de Gigantes	278 29	29 00	Salsburge	42 00	48 21
Rio grande	101 11	11 00	Saltom	32 21	62 00

S	Longit.	Latitude	S	Longit.	Latitude
Salvado	311 21	05 00	S. Pole de Hon	20 41	48 48
Samaria	72 21	33 40	S. Sampson	306 29	40 29
Sandersons Tower	320 00	65 29	S. Vincent	0 29	17 29
Hope Sanderson	316 21	72 41	S. Vincent	318 41	11 51
Sandry	162 54	53 00	Sapom Island	107 11	00 29
Sanfon	20 48	43 21	Sarachi	84 29	44 11
St. Crux	334 21	43 29	Saragofa	26 11	41 51
St. Christophers	319 10	17 00	Sardinia	39 00	40 00
St. Davids	26 00	51 00	Satyrorum Island	174 11	46 30
St. Dominigo	307 11	17 51	Satavapoly	75 29	47 21
St. George	357 11	39 00	Scarborough	24 51	54 51
St. Helena	24 30	16 00 S	Shorland	25 00	60 00
Santiago	164 29	20 29	Scotland Reg.	20 00	57 00
Santiago	298 11	32 11	Segidin	49 00	47 11
St. Jago	175 29	02 00 S	Seames	19 29	48 21
St. John de luz	25 11	43 21	Senega Reg.	13 00	14 00
St. Lazaro	71 00	11 21 S	Serneri Reg.	106 29	33 29
St. Lucar	21 21	37 11	Sabolther	83 41	56 20
S. Lucia	1 01	37 00	Shahaskila	91 29	53 09
S. Malo	24 21	48 50	Shrewsbury	22 35	52 55
S. Maria	82 29	17 00 S	Sicraleone	15 30	07 40
S. Maria	240 41	34 21	Seaholt	8 30	65 20
S. Maria	0 29	56 00	Siber Reg.	96 20	59 30
S. Maries	85 11	44 29	Sicilia	45 00	37 30
S. Maries of Naza.	66 30	16 29	Sidon	72 10	36 30
S. Martha	301 21	10 41	Siam	140 00	13 49
S. Martin	321 11	51 00	Sinai mountain	27 00	30 00
S. Martins Island	293 40	46 51 S	Sinus Mexico	280 00	26 00
S. Matthews	21 11	01 51 S	Sinus Persia	85 00	29 00
S. Michel	60 50	65 29	Sion	59 10	12 40
S. Michael	0 50	38 05	Sipanta	45 30	41 50
S. Miguel	317 21	47 21	Sivil	18 06	37 45
S. Miguel	291 41	09 11 S	Saba	55 50	58 41
S. Miguel	168 00	24 00	Slavonia	47 00	45 00
S. Miguel	249 00	32 51	Slego in Ireland	15 35	54 15
S. Nicolas	69 00	64 00	Slowoda	68 20	64 30
S. Nicolas	323 21	53 41	Slowoda	86 30	18 41
S. Nicolas	2 02	17 00	Smyna	60 21	40 29
S. Petro	64 29	01 29	Snavel	2 30	64 21

S T	Longit.	Latitude	T V	Longit.	Latitude
Sorlinge	18 00	50 00	Terra alta	160 29	06 51 S
Spacado	46 50	45 21	Terra alta	45 21	15 21
Spier	35 30	49 21	Ter de los fumes	322 29	40 21 S
Spina	60 50	03 29	Tharús	115 29	49 00
Stad	30 40	61 41	Thessalonía	53 44	44 21
Stapholt	2 20	65 41	Texel in Holland	31 00	53 15
Stetin	42 10	53 51	Thouloufe	28 40	43 50
Stoby	52 30	44 00	Thunnis	67 40	32 00
Stocholme	42 00	58 11	Tygris a River	84 00	34 30
Straights of Matu- chin	74 30	73 11	Tacors	54 50	46 00
Swedia Reg.	40 00	60 00	Togora	146 00	49 50
Sumatra an Island	83 40	00 00	Toledo	22 50	39 40
Sohar	92 23	23 05	Tollen	34 05	43 20
Surrar	109 50	20 07	Toul	33 10	40 10
Swally road	109 31	21 20	Toures	27 30	47 50
Saldania bay	49 00	33 40 S	Tuent	40 10	46 10
Silly	18 00	50 02	Triago an Island	278 40	21 00
Seert	22 00	50 40	Tribanra	63 30	41 50
Sweinburne head	25 30	59 51	Trinidad	355 20	19 10 S
Syria	74 00	39 00	Trinidad	295 50	21 20
Siracuse	44 41	37 00	Trinidad	319 10	09 00
Southampton	24 05	51 15	Trinity Harbour	308 30	36 00
T			Tripolis antiqua	44 21	30 00
T Arasto	48 00	40 29	Tripolis in Barca	45 21	30 30
Taranaca	306 21	30 41 S	Tripolis seria	72 21	30 00
Tarbacan	109 29	34 51	Troyja	59 00	42 30
Targa Reg.	32 00	25 00	Troy	31 00	42 10
Taragona	29 29	40 41	Tupa	41 51	64 30
Tarso	71 21	40 00	Turfon	131 30	56 30
Tartar	152 00	63 21	Tyrus	71 35	55 30
Tartaria Reg.	130 00	62 00	Izercra	79 50	49 20
Tasken Reg.	129 00	49 00	Talao	159 00	03 30
Tatracin	55 00	44 51	Ternato	160 50	00 55
Tecou	116 29	00 41 S	Tidore	160 50	00 50
Tenariffe	8 11	27 29	Timore	139 12	10 20 S
Tendua Reg.	170 00	59 00	Tunia	40 00	36 00
Teneiab	46 41	61 11	V		
Ta cera	358 23	39 00	Valentia	29 20	39 41
			Variano	107 50	39 00

VW	Longit.	Latitude	WXYZ	Longit.	Latitude
Varon	83 30	70 30	Westerhold	40 29	67 41
Vaygats and Island	81 30	69 22	Whitbay	24 26	55 00
Venice	41 40	41 51	Whitsonhead	316 05	41 45
Verna Reg.	133 00	22 30	Wiborough	56 29	62 35
Varona	40 40	45 50	White Ifle.	25 11	50 29
Viana	27 30	42 00	Sir Hugh Willou-	60 00	72 00
Viatca	87 50	59 30	ghbins Island		
Vienna	45 30	48 30	Winterton	27 20	53 29
Villa longa	28 20	02 40	Wologda	73 50	09 29
Ville conde	17 30	41 30	Wologda	74 30	60 10
Virginia	301 01	36 00	X		
Vithrod	61 30	51 30	X Aques	122 20	20 29
Bona Vista	4 30	15 30	Y		
Buena Vista	308 04	40 11	Y Armouth	27 30	53 00
Buena Vista	177 30	23 30	Y York	23 30	54 29
Ulm	37 50	48 50	Yusqua	303 30	11 00
Volga River	75 40	58 00	Yuchcope	21 56	56 20
Upsalia	42 50	00 00	Z		
Vigis a river	85 50	53 20	Z Acana a Ri.	6 40	13 00
Visting	79 30	61 30	Z Zacutula	169 40	20 00 S
W			Zacotan an L.	88 00	12 51
W Aersber-	30 00	57 20	Zama	49 30	14 00 S
ghan			Zama	74 41	11 41
Warehouse	50 30	70 16	Zante	51 00	38 00
Earle Warwicks	323 11	62 01	Zeilam	104 00	08 00
foreland			Zanthage Reg.	20 00	24 00 S
Waterford	17 15	52 16	Zanzaber	37 51	05 29
Count Warwicks	330 41	64 41	Zara	48 25	45 22
found			Zaradrusa River	126 00	94 00
Wakefield	23 48	53 45	Zavan	48 29	51 00
Wassilgo Road	81 50	56 41	Zedica	48 00	29 29
Waxon	49 20	52 29	Zegzeg Reg.	36 41	14 41
Waymouth	23 50	51 00	Zovazembia	83 29	74 00
Welichy	96 30	56 00	Zinguis	76 11	49 29
Wilkipoyassa	101 20	63 29	Zoidalanol	137 31	03 51 S
Wolitz	63 40	56 51	Zuenzigna Reg.	25 00	25 00
Weroy	39 50	08 41			
Wessel	31 29	51 29			

The Names of such Books as are printed and sold by George Hurlock, at St. Magnus Church-corner.

THe Art of Navigation, by Martin Curtis. Safeguard of Saylor's, or Great Rutter, by Ro. Norman. A Table of Gauging all manner of Vessels, by Jo. Goodwin. Path way to perfect sayling, by Richard Polter. *Peliscus* his Doctrine of Triangles with Canons. *Norwoods* Doctrine of Triangles with Logarithmes. *Norwoods* Epitomy, applied to plain and Mercators sayling. *Norwoods* Seamans Practice, containing a Fundamental Problem in Navigation, experimentally verified, to the which is also added the same Authors Tables of seperation and alteration. Navigator, by Capt. Charles Salomon newly printed, with additions, shewing the Deceits of the Plain Charts used in our time, and a way to prove the projection of any Plain Chart. *Dary's* description and use of a Universal Quadrant. Seamans Dictionary, or the Exposition and Demonstration of all the parts and things belonging to a Ship: together with an Explanation of all the Terms and Phrases used in the practice part of Navigation, by Sir Henry Manwaring.

There is lately printed in a portable Volume, exact Tables of Natural and Artificial Sines, Tangents, Secants and Logarithms, and an Institution Mathematical, containing their Construction and use in the solution of all Triangles Plain and Spherical, and the Application thereof in Astronomy, Dyalling, and Navigation.

There is likewise published by Mr. Richard Norwood, new Tables of the Suns place, right Ascension and Declination, which Tables are referred to the Meridian of Summer Islands.

Seamans Secrets.

Seamans Glasse, shewing the use of the Plain Scale in Astronomy & Navigation.

The Compleat Canoner, shewing the principles and grounds of the Art of Gunnery, as also servicable Fire-works for Sea and Land.

The Advancement of the Art of Navigation, or Seamans Canon of Triangles shewing by a new Canon of Sines, Tangents, and Secants how to resolve all Cases of right lined Triangles, onely by looking into the Tables, without any Calculation. Particularly applied to all the three Kinds of Sayling, viz. by the Plain Chart, Mercators Chart, by a Great Circle; And to the Art of Surveying.

Trigonometria Britannica, or the Doctrine of Triangles, in folio, exhibiting the Logarithmes of all numbers from one to a hundred thousand, in a large Figure and but a few sheets, the Sines and Tangents to the hundredth part of a Degree, the three first degrees to a thousand parts, with Mr. Gellibrands Doctrine of Triangles faithfully translated from the Latin Copy: and an Institution, shewing the construction of both the Canons in a more compendious manner then hath been hitherto published in the English Tongue.

The Sector on a Quadrant, a Treatise containing the Description and Use of three general Quadrants accommodated for the ready finding the Hour and Azimuth universally in the equal Limbe, with an Appendix shewing how to make Dials from a reflexive Glasse, placed at any Rectification, by John Collins.

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